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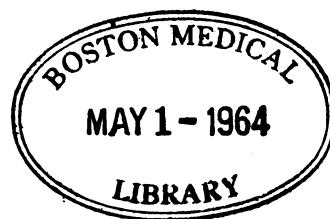
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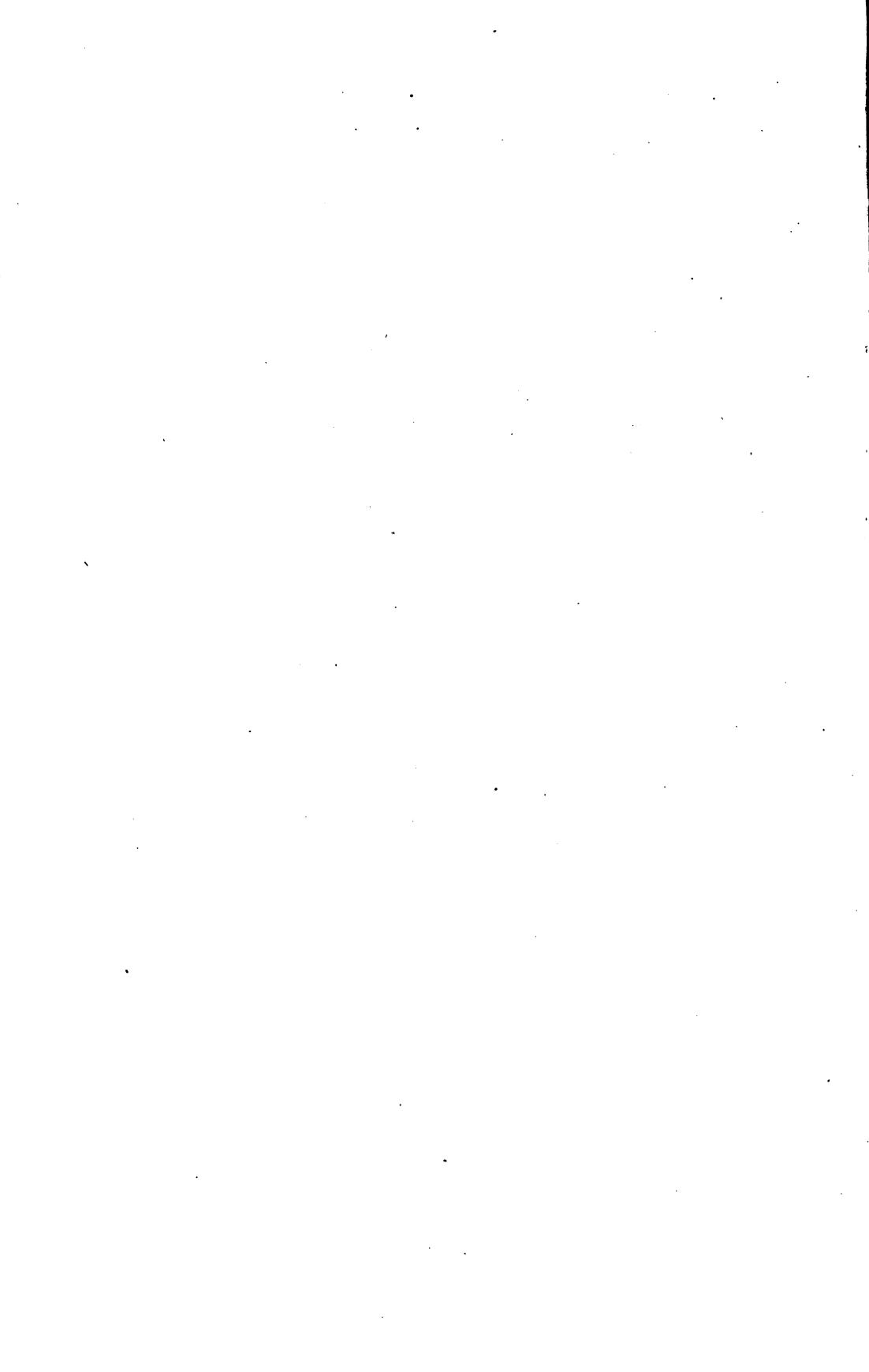
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A NURSE'S GUIDE

for

THE OPERATING ROOM

by

Nicholas Senn, M.D., Ph.D., LL.D., C.M.

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P R E F A C E.

This little book is intended to serve as an aid to the trained nurse in her work in the operating room. The text is made up largely of abstracts of lectures delivered by the Author to the pupils of the Training School of St. Joseph's Hospital, Chicago.

The principal aim of this "Guide" is to instruct the nurse in as concise and thorough a manner as possible in the details of her responsible duties before, during, and after operations. The technique of asepsis is given a prominence commensurate with the importance of the subject. The most important wound complications are mentioned and briefly described, so that the nurse may recognize them and give timely warning to the attending surgeon. Formulae for the most reliable antiseptic solutions in common use are given. In giving the directions for preparation for the most important major operations, a list of instruments is given and ligature, suture, and dressing material are described.

It has been deemed advisable to append illustrations of instruments in general use, so as to familiarize the nurse with their names and use.

N. SENN.

Chicago, April, 1902.



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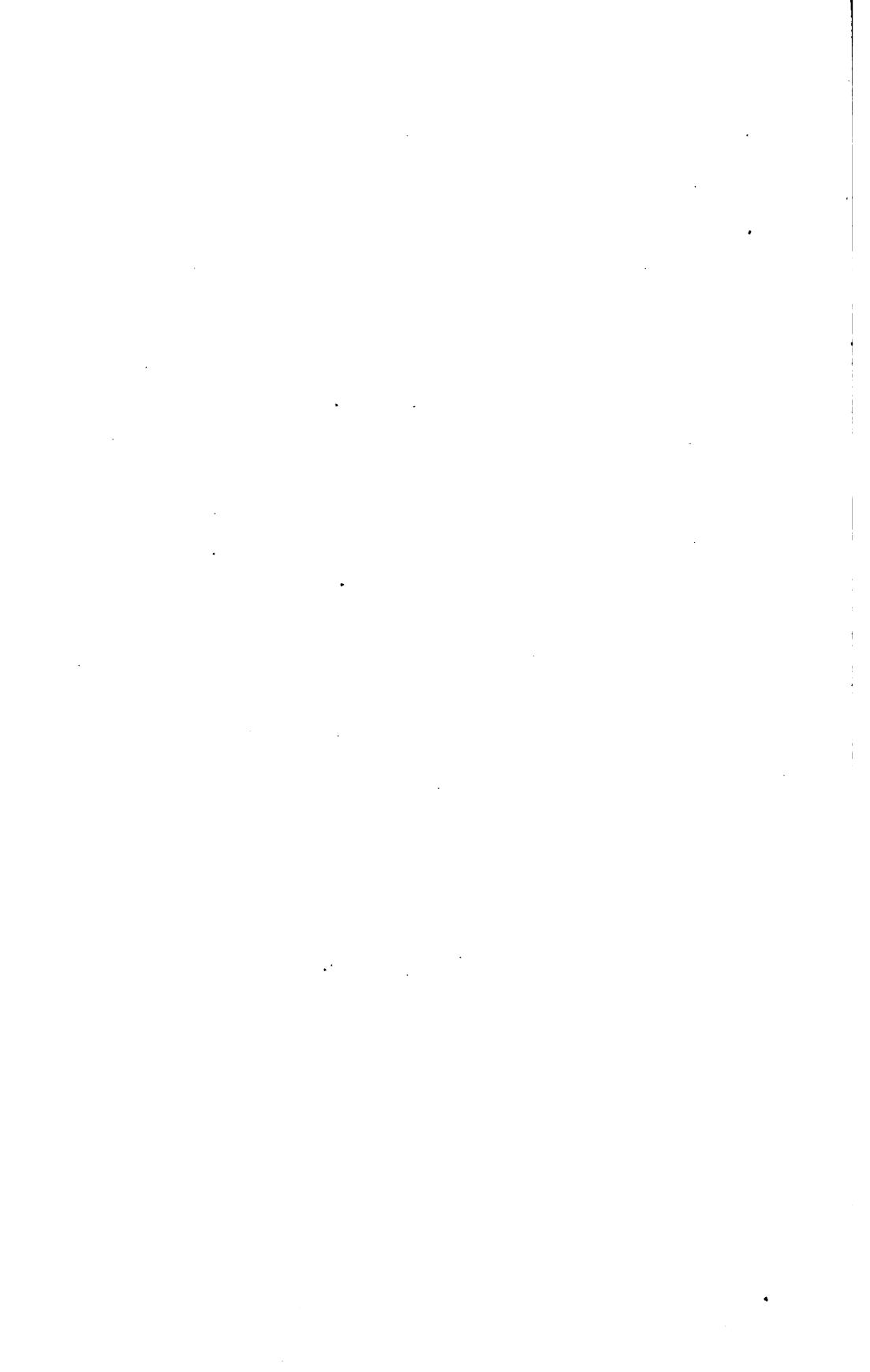
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CHAPTER I.

Preparation of Operating Room in a Private House.

In private homes a room is to be selected that is least frequented, and very often the kitchen will recommend itself as the best room for this purpose. Carpets, curtains, pictures and all unnecessary furniture must be removed. Ceiling, doors, floors, walls, windows or blinds and all objects in the room must be scrubbed thoroughly with hot soda solution, to be followed by scrubbing with a solution of corrosive sublimate 1:1000 or carbolic acid 5 per cent.

The air of the room must receive proper attention, especially in large cities and in small, badly ventilated houses.

The microbes developed upon the surface of the earth find their way in limited number into the lower strata of the atmospheric air by currents of wind that carry with them visible dust. Naegeli showed, a quarter of a century ago, that microbes are transported through the air, through the medium of dry dust, never from fluid organic media in which they grow. Dry air contains more microbes than moist air because more dust is suspended in it, which serves as a carrier for the microbes. Rain carries with it microbes from the air to the surface and purifies the atmosphere.

Nature's process should be imitated in the operating room. The microbes floating in the air should be precipitated by moisture in the form of steam or spray; by doing so the air is purified and the microbes become

attached to the moist floor, which should be kept moist until the operation is completed. For the cleansing of wall paper von Esmarch has recommended rubbing with bread, and his advice is based on the results of carefully made experiments.

Whenever possible, the room should be prepared the day before the operation, after which the doors and windows are closed. In emergency cases this can not be done, but the atmosphere can be moistened with steam in a very short time during and after the mechanical and chemic cleansing of the room and its contents.

The kitchen table can be converted into an operating table that will answer every purpose, by placing upon it a blanket properly folded and covering the same with a clean sheet.

The kitchen stove does excellent service in sterilizing everything that can be sterilized by heat—wash-basins, pans, water, instruments, etc. Napkins and towels that are to be used during the operation and the sterility of which is doubtful should be boiled for five minutes in soda solution. Sterile water, hot and cold, and in sufficient quantity, must be kept in readiness, as well as sterile vessels, for use during the operation.

An active, efficient nurse can prepare any room in a few hours so that it will be safe to perform any operation, by making liberal use of hot soda solution, hot water and potash soap, antiseptic solutions and steam.

For major, prolonged operations, the temperature of the room should be kept at not less than 75 degrees F. Warm blankets, bottles filled with hot water, or warm

bricks must be kept in readiness to supply the necessary heat in operations on feeble patients, or in cases in which shock is liable to set in as an immediate effect of the operation. A hypodermic syringe, strychnin tablets, capsules of nitrite of amyl, alcoholic stimulants, ether and chloroform must be kept within easy reach of the anesthetizer.

Brushes used for hand and surface disinfection are rendered sterile by exposing them to live steam for thirty minutes, or by boiling them in soda solution from five to ten minutes. Before hand disinfection is commenced coats are laid aside and the sleeves are rolled up securely above the elbows when the operator and his assistants are ready for the operating room. Should gowns not be on hand, night shirts answer as excellent substitutes and in the absence of such, a clean sheet may be wrapped around the chest and abdomen and fastened with safety pins. Towels can be used in the same manner for the arms.

As microbes attach themselves much more readily to woolen fabric than linen or calico, the nurses should always wear a calico dress and over it an aseptic gown. If during the operation the hands of any one connected with the operation should become contaminated, they should again be thoroughly disinfected. The antiseptic solution which the operator may prefer should be placed within easy reach to be used when his hands become bloody.

CHAPTER II.

Preparation for Major and Minor Operations.

Ample experience has demonstrated that infection by contact is to be feared much more than infection by microbes suspended in the air. It is generally conceded that operation wounds are most frequently infected by contact with the hands of the operator or his assistants. The risk of infection increases with the number of assistants and this statement applies with special force to new and inexperienced assistants, as is the case with college clinics in our country, in which the assistants serve for only three or four months at a time.

Since Eberth discovered numerous bacteria in normal perspiration in 1875, it has been found that the surface of the body is inhabited by a whole flora of pathogenic microbes. They are most numerous upon the hairy parts of the skin, in the folds and crevices, in the outlets of the glandular appendages and especially in the subungual spaces of the fingers.

Careful hand disinfection is an essential prerequisite to aseptic surgery. The hands of the assistants and nurses should be as carefully disinfected and kept so as those of the operator. Each hospital has its peculiar method of sterilizing hands and arms, also of sterilizing instruments and disinfection of the field of operation or injury.

Directions for Hand Disinfection.

First.—Scrub for fifteen minutes with hot water and potash soap hands and arms to elbows.

Second.—Trim, clean and scrape nails, scrub again in turpentine, again in hot water and potash soap, rinse with clear hot water to remove soap (soap destroys the antiseptic properties of bichlorid).

Third.—Alcohol.

Fourth.—Immerse in bichlorid solution 1:1000 for five minutes, using nail brush and finally wash thoroughly with alcohol.

The hands thus disinfected are surgically clean, therefore nothing should be touched which is not aseptic.

If the operator calls for potassium permanganate further preparations are necessary, such as the following:

Provide four basins: one containing saturated solution of potassium permanganate; the second, sterilized water; the third, a saturated solution of oxalic acid, and the fourth a 1:1000 solution of mercuric bichlorid.

First, the hands and arms to the elbows are soaked in the potassium permanganate solution until the skin becomes brown.

Second, the hands and arms are washed in the sterile water.

Third, the stain is thoroughly removed from the skin by scrubbing with the oxalic acid solution.

Fourth, the hands are washed in the sublimate solution.

Fifth, alcohol is freely poured over the hands.

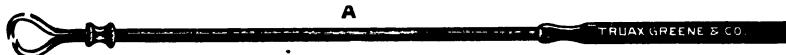
Adequate preparations for hand disinfection must be made in the treatment of all open injuries, for all operations surgical, gynecological and obstetrical and all obstetrical manipulations.

General Anesthesia.

In the absence of a qualified assistant the educated nurse is often called upon to administer a general anesthetic and should therefore be familiar with the method, and quick to discover signs of danger and

prompt in anticipating them by judicious, intelligent treatment.

In emergency work anesthetics must often be given without any elaborate preparations, owing to the urgency of the case. When time permits, everything should be done to make ample preparations for all possible emergencies. The stomach should invariably be empty. Vomiting is likely to be provoked by the anesthetic, and the food ejected might enter the air passages, causing immediate death from asphyxia or, if this danger is passed over, an aspiration pneumonia is a more remote complication. If the anesthetic has to be given on a full stomach, the patient should be turned on one side, with the head in a dependent position during the act



Sims' sponge-holder.

TRUAX GREENE & CO.

of vomiting, so as to favor the ejection of the food from the mouth.

The bowels and bladder should be evacuated, the former by cathartics and enema, the latter if need be, by aseptic catheterization.

All unnecessary clothing must be removed, especially such as would interfere with the free movements of the chest and abdomen.

The cavity of the mouth must be inspected, and all foreign substances, such as artificial teeth, gum, food, etc., removed.

The patient is placed on the operating table, with the head on the same level as the body, or slightly elevated on a small pillow, or what is still better, a firm compress.

Upon a small stand or chair at the head of the operating table, and within easy reach of the anesthetizer, are placed all articles needed during narcosis—ether, chloroform, tongue-holder, hypodermic syringe charged with a solution of 1/30 of a grain of strychnin, granules of digitalin, 1/100 of a grain, capsules of nitrite of amyl, wash-basin, tongue forceps, a four-ounce bottle of whisky or brandy, a two-ounce bottle of vinegar, an electric battery, a chloroform mask, an ether cone, a sponge holder with small gauze sponges, and a number of towels. The anesthetic must be pure—Squibb's ether and chloroform can be relied upon.

Everything being in readiness for the narcosis, the surface of the body not to be exposed during the operation should be well protected with woolen blankets so as to prevent unnecessary and perhaps dangerous loss of body heat during the operation.

The temperature of the room should be not lower than 75 degrees F., and not higher than 85 degrees F., according to the general condition of the patient and the nature and probable duration of the operation.

The skin exposed to the irritating action of chloroform is covered with oil, vaselin, butter, cream, or any other fatty substance.

The anesthetizer takes his place at the head of the table, seated on a chair or stool of convenient height. The patient's mind must be diverted as much as possible from the ordeal before him. With the exception of a few words of encouragement, no conversation should be carried on between the patient and the anesthetizer after the narcosis has commenced. Silence must be strictly

enforced. Anxious relatives and useless bystanders should be excluded.

A few drops of chloroform are poured on the mask, or in the absence of such, on a handkerchief folded once or twice and held for a few minutes at least, four inches from the face when it is brought gradually nearer, but not in contact with the face, until the patient has become accustomed to the irritating effects of the vapor. The same precaution is necessary in administering ether. As soon as the mask has been brought in contact with the face, the chloroform is dropped upon it continuously, as an abundance of air passes through the loose meshes



Hypodermic needle, reinforced.



Hypodermic needle, plain.

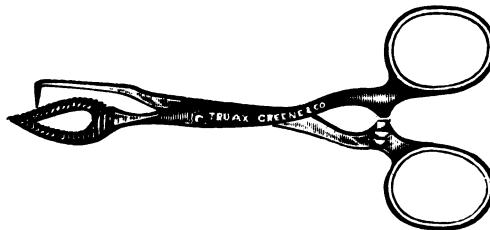
of the gauze, thus diluting the vapor of the anesthetic and furnishing the necessary amount of oxygen.

It is during the beginning of the narcosis that the patient's mind should be occupied and concentrated upon something foreign to the procedure he is undergoing. This can be accomplished in one of two ways: he is asked to count slowly until consciousness is lost, or is requested to hold one of the upper extremities in a vertical position. The loss of consciousness in the latter instance is announced by the dropping of the helpless limb. This stage of anesthesia will suffice for short operations and when it is intended to operate under partial anesthesia. Usually complete anesthesia is preceded by a stage of excitement of variable duration. It

is during this stage that the anesthetizer feels keenly the weight of his responsibility. The patient shouts, prays, swears, sings, cries, laughs or fights, according to his temperament, habits, religious belief, occupation or social position in life. Tonic and clonic spasms, irregular respiration and cyanosis are some of the alarming symptoms of this stage. This stage may subside in a few minutes or may continue for ten or fifteen minutes, or even for a longer time. Under the continued administration of chloroform by the drop method the excitement and convulsive movements gradually subside, and the narcosis passes into the stage of tolerance or full anesthesia. This is announced by muscular relaxation, snoring, puffing of the cheeks, and complete loss of consciousness and sensibility. The pupil is contracted, the eyeballs make asymmetric movements, the pulse becomes smaller, softer and more rapid, the respirations become more rapid and shallow. This is as far as it is advisable and safe to carry the effect of the anesthetic. The disappearance of the corneal reflex is an indication that the anesthesia has reached the limits of safety. Dilatation of the pupils is always a signal of great danger and a strong and unmistakable reminder that the effect of the anesthetic has been carried beyond the limit of safety. The administration of the anesthetic must be immediately suspended until the pupils contract and the corneal reflex returns.

One of the common first ill effects of the anesthetic is the disturbance of the function of respiration. During the first few inhalations the patient often holds his breath and respiration is renewed by asking the patient

to breathe. In other cases the vapor of chloroform provokes a distressing cough, but the cough usually subsides as the anesthesia proceeds. Prolonged expiration interrupted by short inspirations is objectionable, because it interferes with the free entrance of the vapor into the bronchial tubes and consequently retards the complete anesthesia. The regularity of respiration in such cases is usually restored by talking to the patient or by a light blow on the chest. Should these fail, raise the foot end of the operating table. Vomiting may occur during any of the stages of narcosis, especially when the stomach of the patient is not empty. If



Senn's tongue forceps.

vomiting is provoked, the head must be turned to one side and on a level below that of the body, to prevent entrance of foreign substances into the air-passages. An abundance of mucus and saliva in the pharynx often provokes vomiting, in which case the removal of the irritating material with a sponge is the best and most successful method of preventing or arresting it. After each attack of vomiting the cavity of the mouth should be cleared of food, mucus and saliva by wiping with a sponge, towel or handkerchief before resuming the inhalation of the anesthetic. If, in spite of all precautions, food should find its way into the air-passages, an immediate tracheotomy may become a necessity. A

sudden arrest of respiration, which during the beginning of the narcosis is usually overcome by attracting the attention of the patient by talking to him, may become of the most serious import during the subsequent stages of the narcosis. After a few stertorous respirations and stormy, convulsive muscular movements, the rima glottidis is closed by muscular spasm, the abdominal wall makes a few inspiratory contractions, sinks in and remains board-like. The maxillary bones remain in close contact, and the tongue falls backward in such a way that the passage to the larynx is narrowed to an extent incompatible with a normal supply of air to the respiratory passages.

The superficial veins of the forehead, temples and face become turgid, the face purple and the lips cyanosed. The pulse, at first slow, becomes rapid, and lastly almost imperceptible. The cause of approaching asphyxia in such cases is spasmodic contraction of the muscles of the larynx or falling of the tongue backward. Prompt action is necessary to restore the embarrassed circulation. The mouth must be opened, and the tongue grasped and drawn forward with a tongue-holding forceps (Senn's), or if such are not on hand a pair of mouse-toothed hemostatic forceps may be used. Lifting of the lower jaw forward by making pressure against its angles is another valuable expedient in clearing the pharynx. On drawing the tongue forward the air-passage is cleared and the anesthesia continued with additional care. If respiration is not restored upon the removal of mechanical impediments, as is so often the case when the narcosis is carried beyond safe limits, artificial respiration must be resorted to promptly and continued

until respiration is re-established, or all hope of restoring life has vanished. While this is being done an assistant maintains the patency of the respiratory tract by employing a mouth gag to open the mouth and a tongue-holding or hemostatic forceps to draw the organ forward. While artificial respiration is being made the foot of the table is elevated so as to incline the body with the head downward at an angle of 45 degrees. The one who makes artificial respiration stands behind the head of the patient, grasps both elbows with the arms



1. Senn's Inhaler for ether.

extended and by traction brings the arms to the side of the head so as to expand the chest-wall to its utmost. Then the movement is reversed by bringing the arms with the forearms flexed to the sides of the chest, which is then forcibly compressed for the purpose of forcing out from the air-passages as much as possible of the contained air (Sylvester's method). These movements must be made deliberately and not spasmically. Sylvester's method is the only one of the many methods of artificial respiration that have been suggested which is entitled to confidence in such cases. The respiratory

movements are repeated eighteen to twenty times a minute, resembling in this respect normal respiration. Nothing is gained by increasing the frequency. The success of artificial respiration depends on the thoroughness with which every movement is made. If respiration is not restored promptly there is no reason for despair, as success has followed efforts continued for half an hour or more. The efforts should be maintained for at least half an hour unless unmistakable evidences of death make their appearance and warrant suspension of further attempts at resuscitation.

During the time attempts are being made to restore respiration other means of counteracting the toxic effects of chloroform are employed. The most potent physiologic antidote for chloroform is strychnin. Horatio C. Wood advises heroic doses. In adults the first dose should be not less than one-sixth of a grain by subcutaneous injection. This may be safely repeated in ten or fifteen minutes if the nervous centers do not respond to the first dose.

Inhalations of nitrite of amyl stimulate the heart's action and are well calculated to relieve the stagnant capillary circulation. Slapping the chest with a towel wrung out of cold or hot water and the rubbing of the extremities are valuable agents in accomplishing the same object. Faradization of the phrenic nerve is another valuable resource in restoring respiration temporarily suspended by the toxic action of chloroform on the respiratory center. The two electrodes are applied one on each side of the neck over the clavicle at the outer border of the sterno-cleido-mastoid muscle. Although the immediate cause of death from chloroform

is generally its toxic action on the center of respiration, alarming and fatal complications may set in, which are directly referable to its depressing effect on the heart muscle. Such accidents occur usually when least expected, and with a suddenness that is appalling. In a moment the color of the face is changed to a deadly pallor; the pupils dilate and do not respond to light; the corneal reflex disappears; the lower jaw drops cadaver-like; the pulse is either very small, rapid and flickering, or imperceptible; the heart sounds are in-



2. Senn's inhaler for chloroform.

audible; bleeding of the wound ceases; respiration, although shallow and irregular, may continue for a short time until it ceases after a few spasmotic efforts, similar to those observed in a dying person. Such a terrible scene is fortunately rare and when it does occur it is most frequently met in anemic patients and in those the subjects of organic disease of the heart. Nevertheless, it may occur in persons in perfect health, more especially if they are apprehensive, nervous and excited before the operation. Prompt action is urgently indicated in all cases of anesthesia in which heart depression follows

as one of the toxic effects of the anesthetic. Inversion of the body is the first measure to be employed in such cases—to accomplish this in the shortest possible space of time, the foot-end of the operating table is elevated to an angle of at least forty-five degrees. This position relieves the existing cerebral anemia and by doing so the heart center and the heart likewise are stimulated by the increased supply of blood. The patient is at the same time placed most favorably for artificial respiration which becomes necessary if there is, as is so often the case, at the same time an inhibition of the respiratory function. Heart stimulants by hypodermic injection are always indicated. Of these digitalis or digitalin, strychnin, alcohol and coffee will prove most effectual. Tincture of digitalis or digitalin, the former in half-dram doses, the latter in doses of from 1/100 to 1/50 of a grain every ten to fifteen minutes until reaction takes place, will prove most successful. In very grave cases it should be combined with strychnin in decided doses. Camphorated oil administered in the same way, in doses of two or three syringefuls, is a very powerful cardiac stimulant entitled to confidence in such cases. Alcohol in the form of whisky, brandy, cognac or rum, can be given at short intervals by subcutaneous injections or by the rectum. The application of dry heat to the extremities and trunk should never be neglected. Friction with hot cloths is a potent vascular stimulant and will be useful in aiding the other remedies in restoring the general circulation.

The physiologic effect of ether is closely allied to that of chloroform, differing, however, from the latter in that the intracranial blood supply is rather increased

than diminished under full anesthesia and it is therefore less likely to cause depression of the heart's action. The ultimate toxic effects on the brain and spinal cord are almost identical with those of chloroform, and hence its use demands the same preliminary preparations and precautions during its administration. The cone must be held at first at least six inches from the face and as the patient becomes accustomed to the penetrating odor of the vapor it is brought slowly nearer, until it rests evenly on the surface and close enough to prevent the entrance of air underneath it.

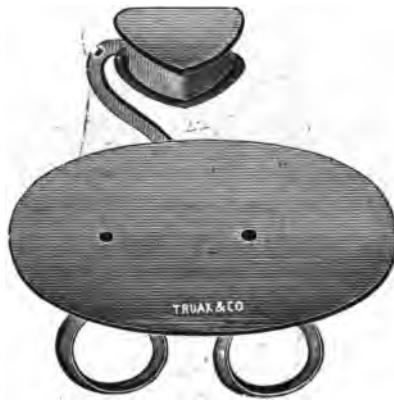
It must not be forgotten that ether is a highly inflammable substance and on this account special care must be exercised in its use in operations where the aid of lamp light is necessary and in the use of the Pacquelin cautery near the ether cone. Accidents during ether narcosis are met by the same treatment as has been described under the head of Chloroform Anesthesia.

The subject of General Anesthesia may be summarized briefly as follows: Proper preparation of patient; adequate supply of the different antidotes and means of restoring suspended respiration; pure anesthetics and slow continuous inhalation; dilution of the vapor with a liberal supply of air; unremitting vigilance and prompt, efficient and persistent treatment when unfavorable or alarming symptoms make it necessary to interrupt the anesthesia.

Local Anesthesia.

Local anesthesia is the ideal condition under which to operate, as it relieves the operator from all anxiety regarding the dangers incident to the administration of a general anesthetic. Ice applied for a sufficient length

of time produces a decided local anesthetic effect which includes the whole thickness of the skin. The degree of cold is increased, and its anesthetic properties intensified, by mixing common salt with crushed ice. The ice and salt should be well mixed and applied in a gauze bag or in a towel. As soon as the skin is whitened by the cold an incision can be made through it with little or no pain. This is one of the simplest and at the same time most efficient procedures for preventing pain in excising small tumors of the skin and in incising superficial abscesses.



Henrotin's gag.

Sulphuric ether is also used in the form of a spray. An ordinary hand spray answers an excellent purpose. Under the action of the spray the skin is partly frozen in a very few seconds and a small incision can be made without any pain.

The anesthetic area in this method of local anesthesia is small, as the spray must be concentrated for the purpose of producing the anesthetic degree of cold. During the local reaction from the freezing process, the patient experiences a prickling pain in the part, which

can be relieved to some degree by immersion in warm water.

More effective than ether are the chlorids of methyl and ethyl. The first is applied to the skin in a compress saturated with it and held against the part to be frozen. The area of anesthetization is regulated in this instance by the size of the compress, possessing in this respect a decided advantage over the ether and chlorid of ethyl spray. Chlorid of ethyl is so volatile that it



DAVISON RUBBER CO.
Esmarch's elastic constrictor.

boils at the temperature of the body. For local anesthesia it is put up in glass tubes with a neck supplied with a metallic attachment from which the spray escapes under body-temperature on removing the metallic cork. In using the spray the tube is held for a few moments in the hollow of the hand, when the cork is removed and the spray begins. The indications for the use of the chlorid ethyl spray are the same as for the ether spray.

Cocain is one of the latest and most useful of local anesthetics. Applied to mucous surfaces in solution of

from 2 to 10 per cent., it produces a complete superficial anesthesia in from three to five minutes. It is used largely in ophthalmic surgery and operations upon mucous membranes. The surface must be carefully cleansed before the solution is applied. It has no effect upon intact skin. To procure anesthesia of the skin it is necessary to inject the solution into it and not under it. If a certain area of skin is to be anesthetized, the injections are to be made with a hypodermic syringe with a fine point under the strictest aseptic precautions, using in preference a fresh solution, the asepticity of which can be depended upon. The needle-



Esmarch's tongue forceps.

point is entered obliquely and enough fluid is injected to raise a circular portion of the skin, which then resembles a blister. Tension is an important element in the anesthetization of the skin, as well as the local anemia produced by it. These punctures are made in a straight line if the incision is to be made in this direction, circular or oval, according to the nature of the operation, and sufficiently close together so that the different centers of local anesthesia touch each other. After the first puncture is made, the needle is always inserted through the skin already anesthetized.

Cocain is not an indifferent drug. Many cases of severe intoxication and a few deaths from its use have been reported. The toxic effects of cocaine are mani-

fested by pallor, dizziness, fainting, headache and delirium, symptoms which demand immediate suspension of its further use. To relieve this condition nitrite of amyl must be administered by inhalation, to be followed if the patient does not rally promptly, by subcutaneous injection of strychnin and alcohol by mouth or rectum.

For subcutaneous use the cocaine solution has been displaced almost entirely by Schleich's infiltration method. This method consists in the use of cocaine and



Esmarch's mask and dropping bottle.

morphin in small doses, in normal salt solution sufficient in amount to produce the necessary degree of tension and local anemia. Schleich recommends the following solutions, which are known as Nos. 1, 2 and 3, according to their strength:

SCHLEICH'S SOLUTION.

No. 1, Strong.

Cocain muriate, 0.2 gm. (3 gr.).

Morphin muriate, 0.025 gm. (2/5 gr.).

Sodium chlorid, 0.2 gm. (3 gr.).

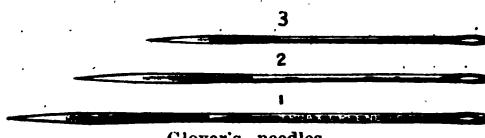
Sterilized water, 100 c.c. (3 2/5 fl. oz.)

No. 2, Normal.

Cocain muriate, 0.1 gm. ($1\frac{1}{2}$ gr.).
 Morphin muriate, 0.025 gm. ($2/5$ gr.).
 Sodium chlorid, 0.2 gm. (3 gr.).
 Sterilized water, 100 c.c. ($3\frac{2}{5}$ fl. oz.).

No. 3, Weak.

Cocain muriate, 0.01 gm. ($1/6$ gr.).
 Morphin muriate, 0.025 gm. ($2/5$ gr.).
 Sodium chlorid, 0.2 gm. (3 gr.).
 Sterilized water, 100 c.c. ($3\frac{2}{5}$ fl. oz.).



To each of the solutions two drops of a 5 per cent. solution of carbolic acid may be added if they are intended for stock solutions, to preserve them in a more nearly perfect antiseptic state.

Of the No. 1 solution as much as 6.5 fluid drams may be injected during one operation; of the No. 2 as much as 3.4 fluid-ounces, and of the No. 3 even a pint



Mouse-toothed tissue forceps.

has been used with safety. The No. 2 solution is the one generally used, the strong and weak solutions being applicable only in exceptional cases. In infants and children a general anesthetic is preferable to local infiltration by Schleich's method.

No. 1, the strong solution, is seldom used. Beta-eucain is now frequently used as a substitute for cocaine, as it is less toxic and produces the same anesthetic effects.

Spinal Anesthesia.

Local anesthesia on a large scale is now occasionally practiced by injecting cocaine or beta-eucain solution into the spinal canal. The injection is made with a hypodermic needle—the parts below the seat of injection are thereby rendered anesthetic.

Anesthesia Room.

Pin a towel around the head of the patient, remove the night gown, roll undershirt up over the chest, put on surgical drawers, remove false teeth, and replace the antiseptic compress with a sterile towel saturated with warm solution of bichlorid 1:1000, and over this place a sterilized towel. When the patient is anesthetized put on a laparotomy gown, catheterize, wrap lower limbs in a blanket and cover with a sterile sheet. The patient is then ready to be transferred to the operating room.

The anesthesia room should always be supplied with pure ether and chloroform, appliances for restoring suspended respiration and the antidotes for the anesthetics. The temperature of the room should be comfortable and all noise and excitement carefully avoided.

Intra-Venous Injection.

This procedure has almost entirely taken the place of transfusion of living blood from one person to another or from an animal to a person. This operation is resorted to in cases of grave shock or dangerous hemorrhage.

Aseptic measures must be strictly observed in this as in all other operations.

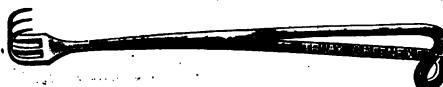
Articles needed:

- One elastic constrictor.
- One tenotome or small scalpel.
- Two tissue forceps.
- Two tenaculum hooks.



Mouse-tooth tissue forceps.

- Two blunt hooks.
- Two pairs scissors.
- Three artery forceps.
- One aneurvsm needle.
- One pair small retractors.



Senn's retractor.



Hypodermatic case.

One small canula (a glass tube drawn out into a fine point), to which is attached a small rubber tube sixteen inches long. At the other end of the tubing attach a glass cylinder or funnel (a glass syringe with-

out a piston will answer). Into the receptacle is poured the physiologic solution of salt at a temperature of 100 degrees F. Prepare one quart of this solution in distilled water.

In emergency cases the ordinary fountain syringe is sometimes used.



Tenotome.

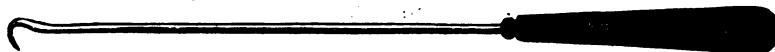
Ligatures:

Aneurysm needle armed with medium-sized catgut ten inches long to ligate vein.

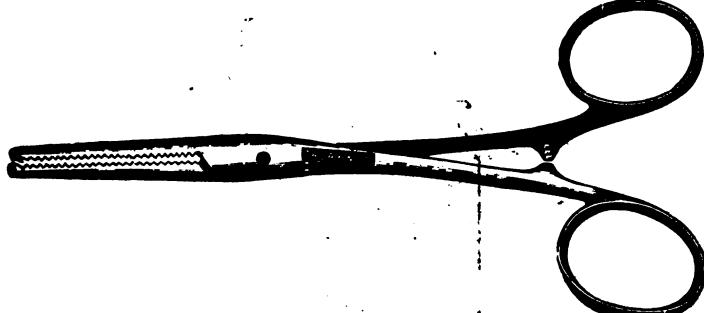
Sutures:

Two glover's needles for silkworm gut.

One glover's needle for horse hair.



Tenaculum hook.



Kocher's hemostatic forceps.

Dressing:

Iodoform and boric acid powder, 1:5.

Iodoform gauze.

Sterilized cotton.

Three sterilized towels.

Sterilized gauze sponges.

Roller bandage and safety pins.

There is one great danger attending this operation—the injection of air into the vein causing air-embolism. To avoid this see that the solution is running freely before the surgeon inserts the canula.

CHAPTER III.

Drainage and Drainage Material.

Drainage is used to prevent the accumulation of serum, pus or wound excretions. This is effected by means of tubular and capillary drains.

Tubular Drains.—Tubular drains are made of perforated rubber and glass tubing. A perforated glass tube loosely packed with gauze constitutes a combined tubular and capillary drain.

Capillary Drainage.—Capillary drainage is made with strips of iodoform gauze, hygroscopic gauze, or a skein of catgut or horse hair.

Mikulicz Drain.—The Mikulicz drain consists of a square piece of iodoform gauze of requisite size placed in a cavity, and filled with narrow strips of gauze until the requisite degree of compression is secured; this drain is used where there is parenchymatous oozing—it serves as a tampon to arrest bleeding and also acts as a capillary drain.

CHAPTER IV.

Sterilization and Disinfection.

Both of these terms are employed to indicate the use of measures intended to remove, destroy or render harmless microscopic vegetable parasites, germs or microbes, which are the cause of all infective processes and infective diseases. By sterilization is meant the absolute absence of pathogenic microbes from instruments, solutions or dressing materials—a condition attainable with any degree of certainty only by exposing these articles to a degree of heat sufficient to destroy bacterial life. Dry heat, steam and boiling are the processes which effect sterilization if the articles are exposed to the germ-destroying effect of heat for a sufficient length of time. Steam, over-steam and boiling are now the most common and widely accepted means of effecting sterilization.

Boiling of instruments, drainage tubes, or any material for dressing, for fifteen minutes, in a 1 per cent. solution of carbonate of soda can be relied upon in the sterilization of any and all articles thus treated. The addition of carbonate of soda is important, as it prevents rusting of the instruments and dissolves and removes fat.

The term disinfection applies more particularly to the means and measures resorted to in rendering infected wounds aseptic and in freeing the hands and field of operation of all harmful bacteria as nearly as

can be done by mechanical and chemical processes. No method so far devised has proved successful in rendering the skin absolutely sterile, hence some surgeons are in the habit of wearing sterilized rubber gloves during operations for the purpose of reducing the danger of infection.

The use of the razor, potash soap and warm water is a preliminary mechanical means to prepare the way for a thorough disinfection by chemical agents, which are known to destroy or inhibit the growth of microbes, of which the most important are carbolic acid, corrosive sublimate, lysol, creosol and alcohol.

Physical sterilization is sterilization by heat. Dry heat, heated dry air, ranges in sterilizing power above the chemical means, but below hot water and steam, as dry heat has very little penetrating power.

Bacteria which do not contain spores are destroyed in dry heat after an hour and a half at a temperature of 212 degrees F., while three hours' exposure at a temperature of 284 degrees F. is required to kill spores. Moist heat is the best germicide.

The thermal death-point of surgical bacteria, which practically means pyogenic cocci which are not spore-bearing, and the bacillus of tuberculosis and its spores, is correspondingly low when they are exposed to moist heat. The pyogenic cocci are all killed inside of ten minutes at a temperature of about 150 degrees F., while the tubercle bacilli and their spores are destroyed at a temperature of 212 degrees F. in five minutes.

Boiling for five minutes at a temperature of 212 degrees F. seems, therefore, to hold good for all practical purposes. Moist heat as steam is another excellent

germicide, as it acts like hot water of the same temperature and it can be used where boiling is not practicable. The germicidal properties of steam depend upon its moisture, on its temperature and on its expulsion of air contained in the articles to be sterilized. Steam of a higher temperature than the boiling point is obtained either by conducting the steam evolved through heated pipes (called super-heated steam), or by evolving steam under pressure (high steam). All known pathogenic bacteria and their spores are destroyed in low steam at a temperature of 212 degrees F. maintained for five minutes. Low steam at a temperature of 212 degrees F. is therefore surgically perfect and easily generated.

Concerning the moisture, it is a well-established fact that the condensation of steam in the articles to be sterilized is a most important factor in the success of sterilization. The exact cause of this is not fully understood. Wet steam will sterilize but dry steam will not. Wet or saturated steam is steam as delivered from a mass of water and holding water in suspension mechanically or as vapor. This is the sterilizing steam. Dry or super-heated steam (steam gas) holds little or no water in suspension. This is the non-sterilizing steam. It corresponds in effectiveness with dry heated air.

Spores.—The spores of bacteria represent the seeds of flowering plants. Each spore develops into a bacterium and thus one crop after another is produced. Most of the bacilli multiply by spores. The spores are much more refractory to destructive agents than the microbes into which they develop. This is particularly true of the bacillus of tuberculosis and tetanus.

Sterilization of Dressings.

Wrap in a separate towel cotton, gauze, sponges, laparotomy compresses, sheets, bandages, doctors' gowns, nurses' gowns, and sterilize thirty minutes with moist heat and thirty minutes with dry heat. Note the time after the water has reached the boiling point.

The usual laparotomy dressing consists of a strip of absorbent cotton, eleven by fifteen inches, covered with sterilized gauze (hygroscopic); on this is put one yard of sterile gauze and a half yard of iodoform gauze loosely applied. This dressing is retained in place by two adhesive plaster strips, length twenty inches, width two inches. For the majority of wounds in abdominal sections a simple abdominal bandage held in place by perineal straps, is required; but for hernia operations, or in any case where the incision is low in the abdomen, a gauze roller bandage is preferred. If the surgeon calls for collodion dressing, give three-inch strip of iodoform gauze and collodion in a small glass with camel's hair brush; also a thin layer of cotton, which is placed over the gauze. When the wound is sealed with the collodion apply the usual laparotomy dressing without the iodoform gauze.

Instruments, etc.—Place in the sterilizer (common wash boiler will answer) instrument trays, basins, pitchers, etc., and boil for fifteen minutes in a 1 per cent. solution of carbonate of soda. Disinfect the tables with carbolic acid 3 per cent., or with alcohol, cover the floor of trays with sterilized gauze, reserving one tray and an aseptic brush for soiled instruments, cover the bottles with sterile gauze and handle corks, covers, etc., with an aseptic gauze sponge.

A celebrated surgeon remarks: "Before an operation it is comparatively easy to render everything surgically clean, but it is extremely difficult to keep them so during the operation."

Place in sterilizer, instruments, pins and needles and boil for fifteen minutes in 1 per cent. solution of soda carbonate. Knives and scissors are boiled for five minutes and placed in a glass dish with alcohol (heat dulls cutting edges). All instruments are injured by corrosive sublimate. When instruments are sufficiently sterilized, the tables, trays and hands having been previously prepared, remove cover from sterilizer with an aseptic towel and arrange instruments in the trays in such order that each one may be readily found when called for by the surgeon. Before the operation the needles are threaded and kept in alcohol. Arrange on the table a bottle of alcohol, bottle of collodion, aseptic glass, camel's hair brush, iodoform powder, iodoform and boric acid powder 1:5, salicylic acid and boric acid 1:4, small glass jar with sterilized safety pins, glass jar with three- and eight-inch strips of iodoform gauze and a glass dish for knives and scissors.

Unless intimately acquainted with the surgeon's methods it is well to have him inspect before operation, the instruments and sutures which you have prepared. Instruments which have become contaminated during an operation must not be used again until they have been sterilized by boiling.

Sterilization of Catgut.

(Catgut: made from submucosa of the intestine of sheep.)

The raw material contains fat and is infected with germs.

First—Roll the catgut without any other preparation in single layers on glass tubes, roll tightly, evenly, leaving a space between each turn, fasten firmly at each end so that it will not loosen during the sterilization.

Second—Soak in sulphuric ether for three days, then place in glass jars for two days to dry.

Third—Immerse in solution of formalin 4 per cent. for forty-eight hours.

Fourth—Place the tubes in a basin under a faucet from which the hot and cold water run together (have the temperature of the water about 98 or 99 degrees F.) for twelve hours. Pack in a jar, dry, for several days.

Fifth—Boil the catgut on the tubes in clear water for fifteen minutes—the water should reach the boiling point (212 degrees F.) before the catgut is put in.

Sixth—Place in alcohol for twenty-four hours.

Seventh—Take catgut off the tubes and roll in small bundles or on glass spools.

Nos. 1, 2 and 3, cut in lengths of twenty inches, several strands in each coil. One strand answers for a suture and when cut in two makes two single ligatures.

Nos. 4 and 5, cut in lengths of twenty-five inches, several strands put together, and tie a loose knot on one end and roll in bundles.

Preserve in the following solution:

Alcohol, 1 pint; glycerin, 1 dram, 24 drops; iodoform, 1½ ounces, 40 grains.

The glass jar or bottle in which the catgut is preserved should be well shaken from time to time, especially before taking the catgut out for use, so that some of the particles of iodoform may remain in the catgut.

For fine and medium catgut use 2 per cent. formalin,

omit the ether and boil from seven to ten minutes. The formalin hardens the catgut and is also a powerful germicide. Catgut when boiled or immersed in a watery solution becomes soft and unsafe for tying, therefore absolute alcohol should be used. The glycerin dilutes the alcohol sufficiently and acts as a lubricant without tending to soften the catgut.

Catgut thus prepared is not only aseptic, but mildly antiseptic, and the iodoform does not irritate the tissues like carbolic acid and corrosive sublimate.

NOTE.—The deformalized catgut is left in the jar for several days to give a chance to the remaining spores to develop into bacteria, which are more surely destroyed by boiling.

Von Bergmann's Method of Catgut Sterilization.

After removing the fat by immersion in sulphuric ether for from twenty-four to forty-eight hours, according to the size of the catgut, place the strands in a 1 per cent. solution of corrosive sublimate, dissolved in eighty parts of alcohol and twenty parts of water, the vessel to be shaken frequently.

Chromicized Catgut.

Chromicized catgut is more durable than catgut prepared in any other manner. Roll the catgut without any other preparation in single layers on glass tubes,* tightly, evenly, leaving a space between each turn, and fasten firmly at each end so that it will not loosen during the sterilization. Soak in sulphuric ether three days, then immerse in a 4 per cent. solution of formalin for forty-eight hours. Place

*Glass tubes six inches long, one inch in diameter, four perforations at each end, half inch from the end.

the tubes in a basin under running water for twelve hours. After this process boil the catgut on the tubes fifteen minutes, then soak in alcohol twenty-four hours. Take the catgut off the tubes, roll in small bundles and immerse in the following solution for one hour:

Chromic acid solution.

Chromic acid.....	38½ grains.
Carbolic acid27 dr.
Sterilized water.....	.57 ounces.

When very strong, heavy catgut is required, soak in the formalin, 4 per cent., five or six days, boil only ten minutes and immerse in chromic acid solution two or three hours.

When preparing fine and medium catgut use 2 per cent. formalin and do not immerse in the sulphuric ether.

Sterilization of Horsehair.

Wash thoroughly with hot water and potash soap. Place the threads in line and fasten at one end. Wrap in a piece of gauze (for the purpose of keeping it under the water), and boil for ten minutes in $\frac{1}{4}$ per cent. solution of soda carbonate; change this solution and boil again ten minutes in clear water.

Preserve in a solution of hydrarg. bichlorid and alcohol 1:1000.

Sterilization of Silk and Silkworm Gut.

Boil for thirty minutes in a 1 per cent. solution of soda carbonate. Preserve in a solution of hydrarg. bichlorid and alcohol 1:1000.

CHAPTER V.

Metric Data.

Nurses are not always familiar with quantities expressed in the metric system, hence are inserted simple data, which may be of use.

The meter, a Greek word meaning measure, is the unit of length; it approaches very nearly to our common yard. This measure or meter is divided into fractional lengths of tenths, hundredths and thousandths.

The tenth of a meter is called the decimeter, the prefix deci meaning 1/10. The hundredth of a meter is called the centimeter, the prefix centi meaning 1/100. The thousandth of a meter is called the millimeter, the prefix milli meaning 1/1000.

If one-tenth of a meter is one decimeter, then ten decimeters must make one meter.

One one-hundredth of a meter being one centimeter, then one hundred centimeters must make one meter.

One one-thousandth of a meter being one millimeter, then one thousand millimeters must make one meter. The terms of expressing the multiples of the meter are: Ten meters make one decameter; the prefix deca meaning 10-fold.

One hundred meters make one hectometer; the prefix hecto meaning 100-fold. One thousand meters make one kilometer, the prefix kilo meaning 1000-fold.

Ten thousand meters make one myriameter; the prefix myria meaning 10,000-fold.

It is seen that the measurements both of the multiples and subdivisions increase and decrease by tens. From the measure of lengths all others are obtained, those of capacity, weight, and area. The unit of fluid measure is derived in this way: A cube is constructed 1/10 of a meter, or one decimeter, in all its dimensions of length, breadth, and depth. This vessel is the unit of capacity, and is called the liter. This unit is too large—being the equivalent to about one quart—for use in measuring medicines, and just as we find no use for gallons, quarts, and pints, but use fluid ounces, fluid drams and minims, so with the metric system we throw aside the liter and use one of its subdivisions. In place of a cube one decimeter in all its dimensions, we construct one that is one centimeter or 1/100 of a meter in length, breadth, and depth, and we call this vessel a cubic centimeter, using the abbreviated sign C.C. The unit of weight is called a gram, and is expressed by gm. The weight which will exactly balance a cubic centimeter vessel filled with water gives us this unit called the gram. We have then for our units the meter, or measure of length; the cubic centimeter, or measure of fluid quantities; the gram, or measure of weight.

The French or Metric System of Weights and Measures.

A Short Table of Equivalents Easy to Remember.

- 500 c.c. in place of one pint.
- 500 gm. in place of one pound avoirdupois.
- 30 c.c. in place of one fluid ounce.
- 30 gm. in place of one ounce weight.
- 4 c.c. in place of one fluid dram.
- 4 gm. in place of one dram weight.
- 1 c.c. in place of m. 15.
- 1 gm. in place of grs. 15.

Reversing Them.

- One pint in place of 500 c.c.
- One pound in place of 500 gm.
- One fluid ounce in place of 30 c.c.
- One ounce weight in place of 30 gm.
- One fluid dram in place of 4 c.c.
- One dram weight in place of 4 gm.
- Fifteen minimis in place of 1 c.c.
- Fifteen grains in place of 1 gm.
- One teaspoonful or fluid dram in place of 4 c.c.
- One dessertspoonful or 2 drams in place of 8 c.c.
- One tablespoonful or 4 drams in place of 16 c.c.
- One wineglassful or 2 fl. ounces in place of 60 c.c.
- One cupful or 4 fl. ounces in place of 120 c.c.
- One tumblerful or 8 fl. ounces in place of 240 c.c.

The equivalents for fractional parts of a grain are quite easy to obtain mentally if the equivalent of one grain is memorized. This equivalent is 65 milligrams, and is written thus: 0.065 gm., or 65/1000 of a gram. Sixty-five milligrams being one grain, then the half of a grain would be half of sixty-five milligrams, which in round numbers would be 0.033 gm. (33 milligrams).

- 1/4 grain would be 1/4 of 0.065 or 0.016 gm.
- 1/8 grain would be 1/8 of 0.065 or 0.008 gm.
- 1/30 grain would be 1/30 of 0.065 or 0.002 gm.
- 1/60 grain would be 1/60 of 0.065 or 0.001 gm.
- 1/3 grain would be 1/3 of 0.065 or 0.020 gm.
- 1/30 grain would be 1/30 of 0.065 or 0.002 gm.
- 1/10 grain would be 1/10 of 0.065 or 0.006 gm.

Antiseptic Solutions in Most Common Use.

Solution of hydrarg. bichlorid, 1:1000.

Hydrarg. bichlorid cor.....	61½ grs.
Citric acid or sodium chlorid.....	61½ grs.
Water	1 gal.

1:1000 is the standard solution for the operating room and from it are made the weaker ones which are used for irrigation.

To make 1:2000, take one pint of 1:1000 and a pint of boiled water.

To make 1:3000, take one pint of 1:1000 and two pints of boiled water.

To make 1:4000, take one pint of 1:1000 and three pints of boiled water.

Continue the same scale for weaker solutions.

Carbolic acid solution.

Carbolic acid is used in the strength of 1 to 5 per cent.

One per cent. solution take 95 per cent. carb. ac...	8½ dr.
Sterilized water	1 gal.
Five per cent. solution take 95 per cent. carb ac...	6½ oz.
Sterilized water	1 gal.

Boric acid solution.

Boric acid 4 per cent., 5 oz. 1 dr., boiled water one gallon.

Salicylic acid solution 3:1000.

Salicylic acid	184 grs.
Soda bicarb	120 grs.

Mix well and gradually add boiled water to make one gallon.

Thiersch's solution.

Salicylic acid	123 grs.
Boric acid	1½ ozs.
Boiled water	1 gal.

Chlorid of zinc solution, 10 per cent.

Chlorid of zinc.....	384 grs.
Distilled or soft water boiled.....	8 ozs.

Bromin solution.

Bromin	1 dram.
Potassium bromid	2 drams.
Water	1 pint.

(For external use only.)

Physiologic solution, 6/10 of 1 per cent.

Sodium chlorid	368 grains.
Water, sterilized	1 gal.

Lysol and creasol in 1 or 2 per cent. solution are often used as substitutes for carbolic acid. These substances

are efficient antiseptics and are less irritating and toxic than carbolic acid.

To avoid mistakes the sublimate solution should be stained a light blue with anilin dye, the carbolic acid solution a light purple, and the physiologic solution a light yellow with tincture of curcuma.

Iodoform emulsion, 10 per cent.

Finely powdered iodoform, one ounce, or one part by weight.

Glycerin, nine ounces, or nine parts by weight.

Boil glycerin, bottle and cork for fifteen minutes; when cool add the iodoform powder and shake well.

One of the most important precautions in handling antiseptic solutions is to read carefully the labels.

CHAPTER VI.

Preparation of Dressing Material.

Iodoform Gauze.—Cut the gauze in lengths of five yards and sterilize for thirty minutes before medication. Handle with surgically clean hands. Sheets, towels and everything coming in contact with the gauze must be aseptic.

Solution No. 1.

Glycerin	1/2 gallon.
Water	1/2 gallon.

Mix and boil for fifteen minutes. When cold pour into a large stone jar which has been rendered aseptic.

Solution No. 2.

Iodoform	3 ounces.
Alcohol	1 pint.
(Mix).	

Note.—The iodoform is not perfectly soluble in the quantity of alcohol; however, it answers the purpose.

Add No. 2 to No. 1, and while stirring briskly immerse thirty ounces or thirty yards of gauze (on an average a yard of gauze weighs an ounce); continue the motion until the gauze is thoroughly and evenly impregnated with the iodoform, otherwise the latter will sink to the bottom and the gauze will not retain the entire quantity. Then pass the gauze through an aseptic wringer, that is, one that has been scrubbed with potash soap, rinsed with sterile water and carbolic acid 5 per cent. Fold the gauze, roll it tightly, wrap in waxed paper and seal. Preserve in a stone jar.

If more than thirty (30) yards of gauze is to be prepared, add to the remaining solution if necessary, one ounce of glycerin and three ounces of iodoform dissolved in one pint of alcohol, as this is absorbed by each thirty yards of gauze. Then proceed as described above.

To improve the color of the iodoform solution, add about one dram of tincture of curcuma for every thirty yards of gauze.

Formula for tincture of curcuma:

Powdered curcuma 4 ounces.

Proof spirit 1 pint.

Let stand till clear. Pour off clear liquid. Continue to add proof spirit till all color is extracted.

Corrosive sublimate gauze.

Corrosive sublimate 10 grains.

Glycerin ½ pint.

Distilled water 32 ounces

Sodium chlorid ½ ounce.

Citric acid 1 ounce.

Mix well.

This solution will moisten sixty yards. Cut in lengths of five yards each and soak for some time to thoroughly saturate the gauze, fold and wrap in waxed paper, making air-tight and place in a tin box.

Carbolized Gauze.

Carbolic acid 3 ounces.

Glycerin 24 ounces.

Distilled water 32 ounces.

This solution will moisten sixty yards of gauze. Cut in five yard lengths, fold, roll, wrap in waxed paper and keep in air-tight tin boxes.

Borated cotton.

Immerse the absorbent cotton in a saturated solution of boric acid. Wring out and dry slowly. Do not open the roll of cotton until after it has been saturated thoroughly in the boric acid.

Preparation of Waxed or Paraffin Paper.

Melt the wax or paraffin (the latter will answer and is much cheaper), and while pouring it on, iron evenly with a hot flatiron.

A more rapid and better method is to pass the paper immediately after its immersion in the melted material through the mangle in the laundry, being careful not to have the rollers too hot, as in this event the paper would be scorched.

For sealing the rolls of gauze, wax is preferable to paraffin.

NOTE.—Waxed or paraffin paper also serves an excellent purpose as a protective in the application of stypes or poultices, and is much less expensive than oiled silk or gutta-percha tissue.

Sayre's Jacket.

A plaster-of-paris jacket to support the spine for the correction of

Scoliosis: lateral curvature of spine.

Lordosis: anterior curvature of spine.

Kyphosis: posterior curvature of spine.

The patient should have a bath and be attired in a smooth-fitting undershirt and stockings.

He is suspended in Sayre's apparatus, which is an iron-tripod intended for this purpose.

If the patient be a small child have him stand on a stool.

Prepare cotton to pad the headgear, two muslin pads six inches long, two inches wide and one inch thick; these pads are placed on each side of the spine, a pad of cotton to serve as a dinner-pad; tie a strip of bandage

around the cotton with which to draw it out when the cast is formed. One dozen plaster-of-paris bandages.

Senn's Fixation Splint for Intracapsular Fracture of Femur.

(Intracapsular: within the capsule of a joint.)

The patient receives a bath and wears a pair of knit drawers. Having been placed on Sayre's suspension apparatus, the splint is applied on the injured side with plaster-of-paris bandages from toes to axilla and on the other side from knee to axilla. For the purpose provide:

One roll of cotton.

Six three-inch and five seven-inch roller bandages.

Two dozen plaster-of-paris bandages and a stool or box upon which the patient may stand.

These patients require a fracture bed, which should consist of iron and measure $6\frac{1}{2}$ feet in length, $2\frac{1}{2}$ feet in height and 3 feet in width, and be provided with an adjustment to tighten the springs. It should be furnished with a hard hair mattress weighing about twenty-five pounds.

CHAPTER VII.

Preparation of Patient for Laparotomy.

Except in emergency cases the preparatory treatment should be commenced three days before operation, during which time the patient is strictly confined to light though nutritious diet, and receives each day a warm bath, laxative, and in operations on uterus or vagina, vaginal douche. To patients who have stricture of the esophagus, pylorus or intestine, no cathartic is given, but with the doctor's permission give a high enema. For pyloric or intestinal obstruction, wash out the stomach (gastric lavage).

On the evening before the operation and previous to shaving the abdomen, denude the pubes with scissors and apply a potash soap poultice. After an hour remove the poultice and shave the entire abdomen, pubes and genitalia, scrub with hot water and potash soap; wrap a little cotton on the end of a match or probe to cleanse the umbilicus. Wash off with sterile water and scrub again, using turpentine and soap; rinse with warm water and dry with gauze; rub ether well into the skin, sponge with alcohol, then use warm bichlorid solution 1:1000 and cover the field of operation with a three-yard compress of sterile gauze, saturated with warm solution of bichlorid, strength 1:3000, oiled linen or waxed paper, pad of cotton and enclose all in a snug abdominal bandage, held in place by perineal straps.

For abdominal and vaginal hysterectomy, also for operations on cervix, the uterine canal should be disinfected in the following manner: Wrap gauze around the index finger, or an artery forceps, and mop out with hot water and soap; then use clear water, give a douche of bichlorid 1:4000 and pack cervix with a strip of iodoform gauze. One hour before the operation remove the gauze and give corrosive sublimate douche and mop vagina thoroughly with alcohol before repacking.

Each of the following articles should be in readiness before commencing to prepare the patient: One pitcher of hot water, bottle of warm bichlorid, two basins, small bottle of turpentine, ether and alcohol, brush, potash soap, razor, probe tipped with cotton, several pieces of gauze, oiled linen, gutta-percha tissue or waxed paper, cotton pad, abdominal binder, perineal straps, eight safety pins and a pair of scissors.

The patient receives a very light supper and no breakfast. One-half ounce of brandy diluted with water may be given four hours previous to the operation.

A specimen of urine should be placed in a sterile bottle for examination.

Five hours before the operation give a high enema of castile soap suds followed by a small one of clear water to rinse the bowel.

Before leaving the room the patient is attired in clean clothing, including a pair of stockings; the hair plaited tightly in two braids.

Operating Room.

The assistant nurse scrubs the field of operation, using hot water and potash soap, then washes off with warm

water, scrubs again with ether or turpentine and soap, rinses with clear water, sponges with alcohol and uses warm solution of bichlorid 1:1000, covering the abdomen with moist antiseptic towel. After patient is placed on the operating table, the head nurse applies laparotomy sheet and surrounds field of operation with dry sterilized towels. The operator and his assistants, having gone through the thorough disinfection of hands, are dressed in white sterilized operating gowns and caps or with sterile towel pinned around each one's head. The head nurse takes charge of the instruments, ligatures and sutures. Immediately before the incision is made, she pours alcohol on the hands of operator and assistants. She is then prepared to anticipate every want of the surgeon, beginning with the scalpel, following with forceps, scissors, etc., as may be required. Having provided a separate tray, she brushes the soiled instruments when necessary and takes each needle from the surgeon when he is through with it, for if left lying about, serious injury to the patient may result.

The senior nurse takes charge of the sponges and laparotomy compresses. She stands conveniently near the assistant who is to do the sponging; if asked to do the sponging, she does not wipe but merely compresses the bleeding parts, allowing the sponge to absorb what it will. After the peritoneum is opened, she hands the small sponges on a hemostatic forceps; this is called "steel sponge." The laparotomy compresses will then be needed. These, before being handed to the surgeon, are wrung out of a hot solution of sodium chlorid 6/10 per cent. (about one dram of salt to one pint of water, called physiologic solution). A hemostatic for-

ceps is attached to each compress. The nurse being accountable for compresses, keeps a record of them and before the incision is closed she counts them again to make sure that none is left in the abdomen.

Upon the junior nurse devolves the care of the doctors' hands and brows. If anything not aseptic has been touched by them she hands bichlorid solution, or when only blood is to be removed a basin of warm physiologic solution of salt suffices.

For a laparotomy the temperature of the operating room should be 75° to 80 degrees F., consequently the doctors will perspire profusely; a few drops of this moisture striking the open wound might cause sepsis; therefore, to avoid this danger, the nurse must wipe the doctors' brows. This nurse must be on the alert to notice and supply every want, if so directed by the head nurse.

One of the highest qualifications of a good nurse in the operating room is to anticipate the wants of the surgeon.

Care of Instruments After Operation.

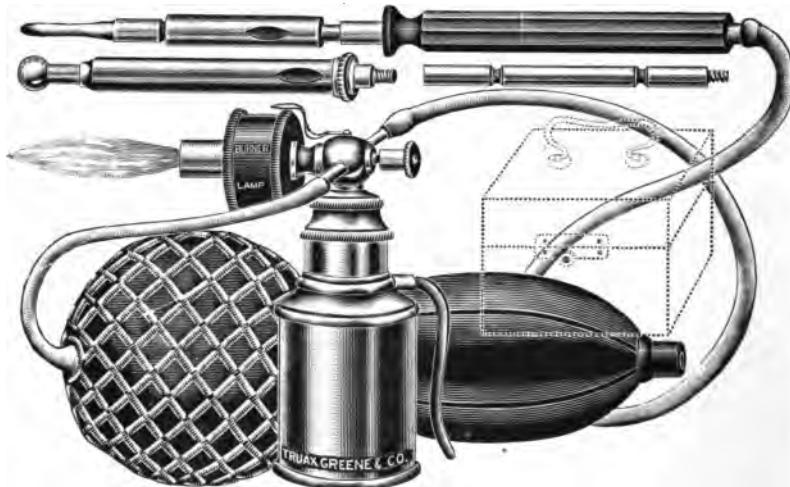
Collect, count and unlock instruments. Cleanse in the following manner: Brush with warm water to remove blood, brush with hot water and potash soap, place under hot-water faucet and allow the boiling water to run on them. Dry immediately with gauze. When removing rust from instruments, use sapolio very carefully, as otherwise the surface of the instruments will in time become injured.

Pacquelin or Thermo-Cautery.

Pacquelin or thermo-cautery is a form of actual cautery in which the heat is produced by blowing benzine

vapor into a heated platinum point (platinum, silver white, almost infusible metal).

When the cautery is to be used the nurse should test it before the operation. Never blow the benzine vapor into the platinum point until the point is well heated in the flame of an alcohol lamp or gas stove; then commence by pressing the bulb slowly. Place the bottle containing the benzine in a basin of hot water; this will



Thermo-cautery.

hasten the heating of the point. See that the rubber tube through which the benzine vapor is conveyed is not twisted or doubled up. Next, keep the platinum point in the flame until it is well heated. Sometimes the cause of the cautery not working is in the benzine, which should be renewed frequently.

When the doctor is through with the cautery burn it out immediately. This is done by placing the point in the flame until the platinum is again well heated, then

quickly remove the rubber tube attached to the handle and press the tube between the thumb and index finger to prevent evaporation. Great care must be taken in handling the cautery, as the benzine is highly explosive.

Hand the cautery to the surgeon with moist sterilized gauze wrapped around the handle.

After-Treatment for Laparotomy Patients.

In the treatment after laparotomy the nurse must be on the lookout for and give timely information of the onset of serious complications, the most important of which are shock, secondary hemorrhage and peritonitis.

The patient is carefully conveyed, without raising head or chest to a bed, which has been previously prepared with a rubber and a draw sheet, well supplied with hot-water bags or bottles, for armpits and lower extremities. Cover the hot-water bags or bottles that they may not burn the insensible patient (much harm has been done by not observing this precaution and a number of suits for damages have been based on carelessness or negligence in this respect). The patient is placed in the dorsal (recumbent) position, with the limbs flexed to relax the abdominal muscles. A pillow is placed under the knees to support them. This position is retained for forty-eight hours, during which time the patient is constantly watched. At the termination of this period the patient may be carefully turned on either side. Pulse and temperature should be taken immediately after operation—temperature should be taken by rectum. (Never take aged persons' temperature in the axilla.)

Hypodermatic syringe, brandy, strychnin, nitroglycerin, digitalis, flannel bandages, and blocks to elevate the foot of bed should be kept in readiness.

The distressing thirst is relieved by sips of hot water given at short intervals or by fragments of cracked ice. No food by the mouth should be given during the first forty-eight hours. In cases of persistent vomiting stimulants and food are administered per rectum.

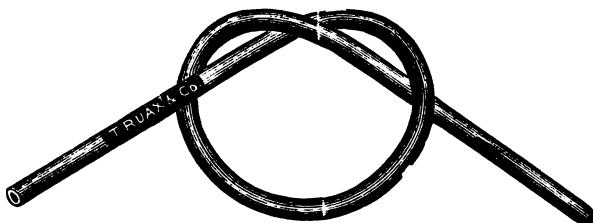
All articles and medicines necessary in the after-treatment should be arranged on a little table in the patient's room before the return of the patient from the operating room.

Diet.

After a laparotomy the patient receives nothing in the form of nourishment by mouth for at least thirty-six hours. The mouth should be frequently sponged out and the lips moistened. A small piece of ice wrapped in a sponge and rubbed over the lips is very soothing to the patient. If he complains of extreme thirst very hot water may be given in one-half ounce doses, but as seldom as possible. Small pieces of ice in the form of ice pills are sometimes allowed. Hot water, being a stimulant, is preferred to ice, which is a sedative. Another objection to ice is the germs which it contains. However, the following is a point in favor of ice—nervous vomiting may be controlled by rubbing the patient's lips with ice. The best method in such cases is to give nothing by mouth, but to relieve thirst by rectal or subcutaneous injections of physiologic solution of salt, thus securing for the stomach complete rest. When giving food or medicine by mouth assist

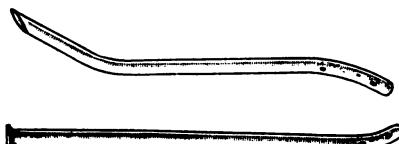
the patient as much as possible. If the patient is extremely weak, nutritive enemata are prescribed.

In the absence of all bad symptoms, towards the end of the second day patient may have a little peptonized milk, beef essence, chicken broth or kumyss, varying the amount from one-half ounce to a half glass, according to the condition of the patient, increasing the quantity



Elastic catheter.

gradually. The majority of laparotomy cases require a cathartic as soon as they recover from the effect of the operation. A teaspoonful of sulphate of magnesia dissolved in hot water given every hour until the bowels move freely is the best course to pursue in relieving the



Glass catheters.

patient and in guarding against peritonitis. If the patient is vomiting and unable to take a cathartic give a high enema of magnesia sulphate ounces 2, glycerin ounces 4, and water ounces 8 ; use the rectal tube.

A hot-water bag applied over the bladder often prevents retention of urine; if obliged to catheterize, which should not be done under six hours after operation, use

a soft rubber catheter (Nélaton); see that it has been boiled and afterwards kept aseptic. Carefully disinfect your hands and the urethral orifice so that no pathogenic microbes are carried with the instrument into the bladder, which might cause cystitis. In the case of women the glass catheter (Kelly's) is the instrument to be preferred; should the catheter slip into the vagina, it should be disinfected by boiling before re-inserting. In inserting the instrument always avoid using force and observe the strictest aseptic precautions.

CHAPTER VIII.

Wound Complications—Shock, Hemorrhage, Etc.

Surgical shock.—This may result either from injury or operation. It is characterized by its sudden onset and great prostration.

Symptoms: Almost imperceptible pulse, subnormal temperature, feeble and often irregular and sighing respiration, countenance pale and body cold to the touch.

Treatment: Elevate the foot of bed (by force of gravity the blood will flow toward the head); surround the patient with hot-water bags; give brandy hypodermatically and give strychnin, grain 1/30; repeat in three hours if necessary; atropin, grain 1/60, for the respiration. Ether administered subcutaneously is also a prompt heart stimulant. Caffein or strong black coffee is a simple and excellent heart stimulant. Saline infusion subcutaneously, intravenous or by rectum, is frequently called for in such cases. With the doctor's permission have the patient inhale amyl nitrite; nitro-glycerin may also be given. Camphorated oil given hypodermatically is a favorite stimulant and should always be kept in readiness.

Internal and secondary hemorrhages often stimulate shock very closely, but the symptoms appear gradually and correspond in severity with the amount of blood lost.

The most prominent symptoms are: dilated pupils, extreme pallor of face, subnormal temperature, wiry

rapid pulse, frequent yawning, cold perspiration, extreme thirst followed in grave cases by convulsions and death.

Notify the doctor at once. Keep the patient quiet, give no stimulants, as they would increase the heart's action and thereby aggravate the hemorrhage; apply external heat. While waiting for the doctor, prepare physiologic solution of sodium chlorid, four-ounce rectal injecting syringe, flannel bandages and the following emergency table:

A flask of brandy.

Solution of strychnin.

Tablets of digitalin.

Hypodermatic syringe.

Tincture of digitalis.

Tablets of nitroglycerin.

Amyl nitrite pearls and a towel to apply them.

Electro-magnetic battery with a glass of water to moisten the electrodes.

Mouth-gag, so that no time will be lost in preparing these life-restoring remedies. After the doctor has arrested the bleeding, he may inject the normal salt solution into the vein (intravenous infusion, see page thirty-one). A four- to sixteen-ounce solution of the same given by rectum is also beneficial.

If the patient is sinking rapidly, the nurse is allowed to make auto-transfusion by elevating the foot of the bed and by elastic compression or constriction, but only one limb at a time, so that the patient may be kept alive until the doctor arrives. The elastic constriction should never be continued for more than two hours at a time.

Peritonitis.

(Peritonitis: Inflammation of the peritoneum, serous membrane lining abdomen.)

This is the next danger to be apprehended after laparotomy.

Symptoms: High temperature, quick wiry pulse, vomiting, distended abdomen, and severe, continuous pains.

In the most serious forms of septic peritonitis the temperature is sometimes subnormal, pain absent as well as tympanites, but the pulse and dry tongue indicate the existence of progressive sepsis.

A four-ounce enema of glycerin and water equal parts will sometimes relieve tympanitic pains immediately. However, the patient should have free defecation at once. Give a saline cathartic; the action of saline cathartics can be hastened by the administration of a turpentine enema (one-half ounce of turpentine, two ounces of castor oil to one quart of soap suds). A brisk saline cathartic promotes absorption of fluids and bacteria from the peritoneal cavity, and by so doing removes the essential cause of peritonitis.

Patients with tympanites should have the abdomen examined frequently for the first forty-eight hours.

One exception to the rule of giving a cathartic is when the operation is performed on the intestines and in the formation of an artificial anus; in the latter case the bowel is kept at rest until it is incised, which is usually done on the second or third day after the operation.

In case of beginning peritonitis and intestinal obstruction the nurse is, if requested, to administer a *High Rectal Enema*.

Prepare one gallon of soap suds, add four ounces of sulphate of magnesia, four ounces of castor oil and two ounces of turpentine; mix well and raise the irrigator containing the fluid eight feet above the level of the patient. Place the patient on his right side, elevate the foot of the bed three feet; insert the rectal tube and in the case of adults administer the whole gallon, which will take from one-half to one hour; assist the patient to retain the solution as long as possible, by compressing the anus with a towel. Lower the foot of the bed, turn the patient on his back and place the bedpan under him, then elevate the head of the bed at least two feet.

Septicemia.

(A general infective process from absorption of septic products, usually the result of infection with pus microbes.)

Septicemia usually begins with a chill or sense of chilliness followed by a gradual rise of temperature. The pulse is rapid, feeble and compressible. The tongue is usually furred and dry. Headache is often complained of in the beginning of the attack. The urine is scanty and heavily loaded with urates. Delirium, restlessness, insomnia, are symptoms which denote approaching danger.

The debilitating effect of toxins on the heart are met by the timely and judicious administration of stimulants.

NOTE.—When administering strong stimulants note the pulse frequently.

Treatment: Digitalis, strophanthus, strychnin and atropia in small doses are excellent cardiac tonics and stimulants, and are indicated in cases where the pulse

is very rapid and soft, denoting a feeble peripheral circulation from a weakened heart.

Alcoholic stimulants are to be given in doses sufficiently large to improve the character of the pulse and at sufficiently short intervals to maintain this effect without interruption. Brandy or whisky in doses of an ounce every two hours diluted with water are most to be relied upon, but champagne and Greek sherry are excellent substitutes. Concentrated liquid food like beef tea, milk or eggnog must be given at regular intervals to assist the action of the stimulants in sustaining the heart's action.

Sapremia.

Sapremia is caused by the absorption of ptomaines from putrefying substances in the body, as, for instance, a decomposing blood clot. The symptoms pointing to intoxication usually yield promptly to the removal of the putrefying material and thorough disinfection.

Pyemia.

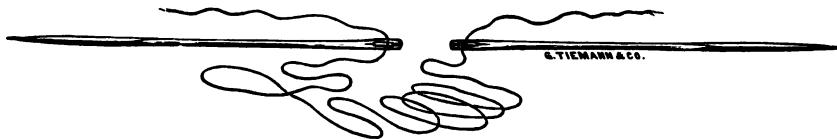
Pyemia is one of the gravest of all wound complications. It develops in connection with a suppurating focus and is indicated and characterized by severe chills at irregular intervals and an irregular temperature. If the patient lives long enough suppuration in one or different parts of the body is to be expected. The general treatment of sapremia and pyemia is the same as of septicemia.

Suturing of Abdominal Incisions.

Surgeons differ in their methods in closing an abdominal incision. Some use silver wire, others silk, silk-worm gut or catgut as suturing material. Some unite

the incision with one row of sutures which are made to include the entire thickness of the margin of the wound. Keith's long needles armed with silkworm gut, silk or silver wire are best adapted for this kind of suturing. Most of the surgeons now employ four rows of sutures. The first row includes the peritoneum, the second the fascia of the recti muscles, the third the skin and underlying fat tissues and the fourth the skin only.

If catgut is used the peritoneum is sutured with very fine silk or No. 1 catgut, for which a fine round curved needle is used. The second row consists of catgut sutures No. 3, which are inserted with a larger round curved



Keith's abdominal needles.

needle. The third row, of silkworm gut sutures, requires a curved needle with cutting edges. The horse-hair sutures constitute the fourth row; for these sutures a small glover's needle answers the best purpose. The subcuticular suture (Halsted) is used by some in uniting the skin. These are fine catgut sutures from which the epidermic layer of the skin is excluded.

Abdominal Operations.

Gastro-enterostomy.

(Gastro-enterostomy: Formation of a new opening between stomach and intestine.)

This operation is required for patients who are suffering from carcinoma or cicatricial stricture of pyloric

orifice of the stomach. Required for the operation are the following instruments and suturing material:

Two scalpels.

Two tissue forceps.

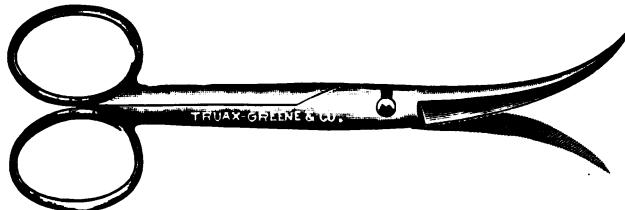


Kocher's director.

Two artery forceps (3 inches).

Eighteen hemostatic forceps.

One needle holder.

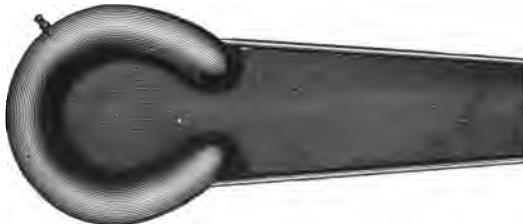


Sharp-pointed curved scissors.

One Kocher's director.

One probe.

One blunt hook.



Kelly pad.

One tenaculum.

One pair small blunt retractors.

One pair large blunt retractors.

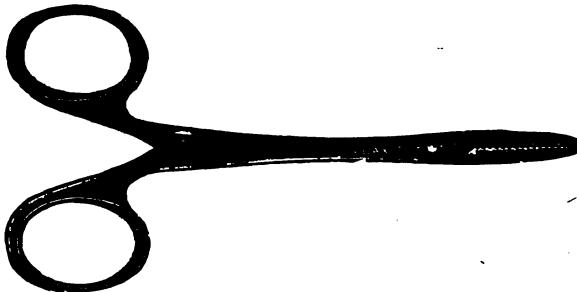
One pair scissors, straight.

One pair scissors, curved, blunt point.

One pair scissors, curved, sharp point.

Murphy button (oval).

One pair Senn's perforated, decalcified bone plates
(large size).



Spencer Wells' hemostatic forceps.

Ligatures:

Catgut No. 1 and No. 2, ten inches long.

Braided silk No. 5, ten inches long.



Blunt four-pronged retractor.

Two cambric needles with spring eye for Lembert sutures.

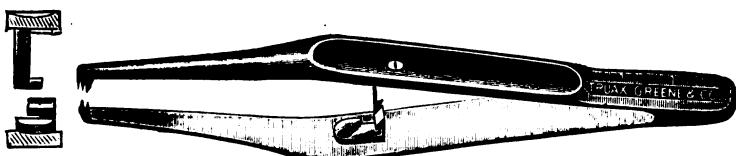
Four cambric needles for braided silk No. 5.



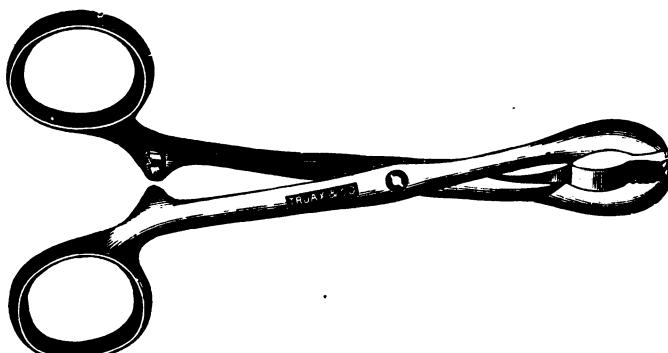
Scissors curved on flat.

Two small round curved needles for catgut No. 1
for peritoneal sutures.

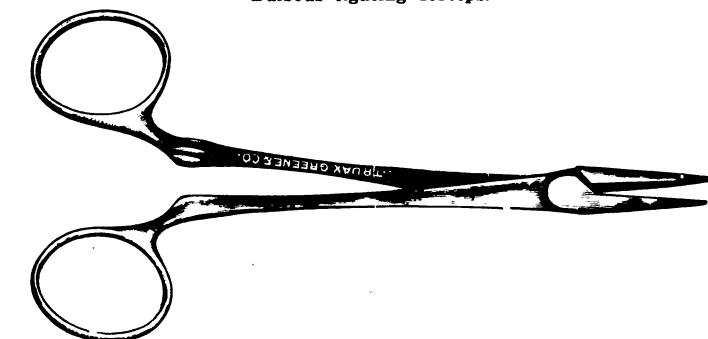
Three surgeon's needles for catgut No. 3, to suture
the fascia.



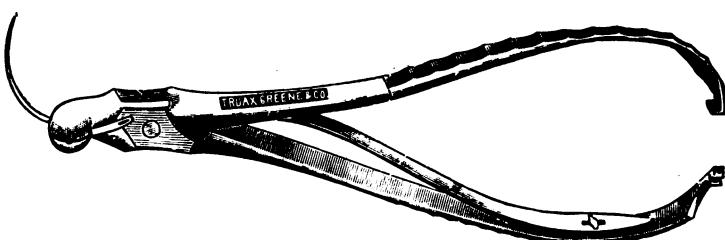
E. J. Senn's automatic tissue forceps.



Bulbous ligating forceps.

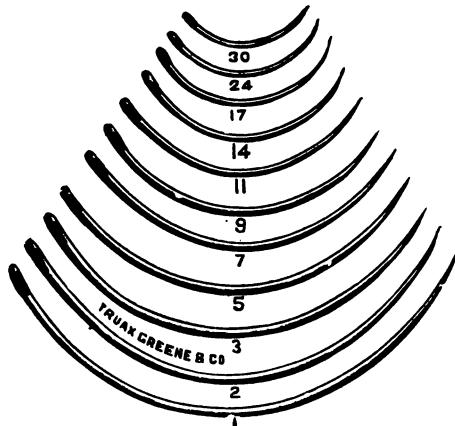


Halsted's straight artery forceps.



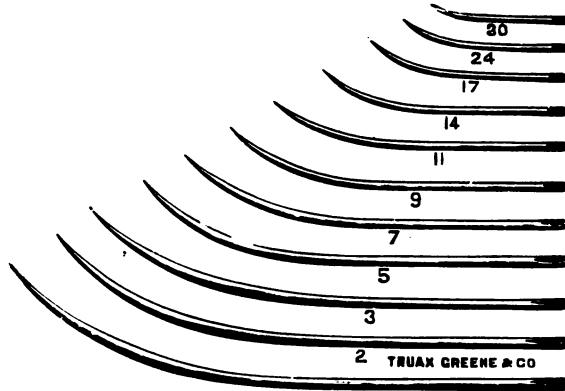
Automatic needle holder.

Three glover's needles for horse hair for superficial sutures.



Surgeon's full-curved needles.

Six glovers' needles for silkworm gut for deep sutures.



Surgeon's half-curved needles.

Dressing, etc.:

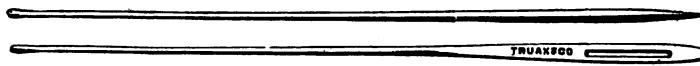
Iodoform and boric acid powder 1:5 or salicylic acid and boric acid 1:4.

One-half yard iodoform gauze.
 One-half yard sterilized gauze.
 A large pad of sterilized cotton.
 Abdominal bandage.
 Perineal straps and safety pins.
 Collodion in an aseptic glass.
 Camel's hair brush.
 Two broad strips of adhesive plaster.



Scalpel.

Two dozen sterilized towels.
 Twelve sterilized gauze laparotomy compresses.
 Supply of sterilized gauze sponges.
 Three sterilized sheets.
 One sterilized laparotomy sheet.
 Bichlorid, alcohol and physiologic solution for the hands.



Probes.

The Senn bone-plates may be purchased already prepared, but the sponges that are in the bottle in which they are preserved should be moistened at least every six months with a solution of alcohol, glycerin and water equal parts. When about to use the plates, wash in carbolic acid 5 per cent. and rinse in salt solution. The lateral or fixation sutures are attached to a cambric needle having a spring eye.

Gastrostomy.

(Formation of a stomach fistula made necessary in carcinomatous, and in some cases of cicatricial stricture of the esophagus).

The fistula is made for the purpose of introducing food into the stomach. Preparations same as for gastro-enterostomy with addition of a non-fenestrated rubber tube the size of a large catheter and eight inches long and the exclusion of Murphy button and bone-plates.

Gastrectomy.

(Excision of stomach.)

The same preparations as for gastro-enterostomy.

Ileocolostomy.

(Anastomosis between ileum and colon.)

Set of Murphy buttons. Prepare second size plates, instruments, sutures, etc., as for gastro-enterostomy.

Inguinal Colostomy.

(Incision of colon to form artificial anus.)

Two scalpels.

Two tissue forceps.

Four hemostatic forceps.

One needle holder.

One Kocher's director.

One probe.

One pair blunt hook retractors.

One pair of deep hook retractors.

Three pairs scissors.

Glass cylinder size of a large lead pencil three inches long covered with iodoform gauze, which should project well beyond the ends of the glass tube.

Sutures:

Three small round curved needles for braided silk
No. 4 to suture the peritoneum to the colon.

Two surgeon's needles and two glover's needles
in reserve.

Unless the symptoms are urgent the colon is anchored in the abdominal incision by the first operation and the bowel is not opened until the second or third day after adhesions have formed. For the second operation, prepare a square of oiled silk or gutta-percha tissue 6x6 inches with circular fenestrum in center, seal edges with chloroform to protect the wound; the cotton under the impermeable cover is sealed with collodion.

One tenotome.

Two tissue forceps.

Two hemostatic forceps.

A pad of cotton.

Hygroscopic gauze and bandage.

Sterilized sheets, towels, gauze sponges and gauze compresses.

Herniotomy.

(Operation for strangulation and radical cure.)

Umbilical hernia, inguinal hernia, femoral hernia and ventral hernia.

Hernia is a protrusion of a viscus from its normal position. Viscus is any organ of the thorax or abdomen. (Hernia may also occur in various parts of the body.)

One scalpel.

One bistoury, curved probe pointed.

Two tissue forceps.

Two hemostatic forceps, long.

Eighteen hemostatic forceps.

One needle holder.

One pair retractors, small.

One pair retractors, large.

Three pairs scissors.



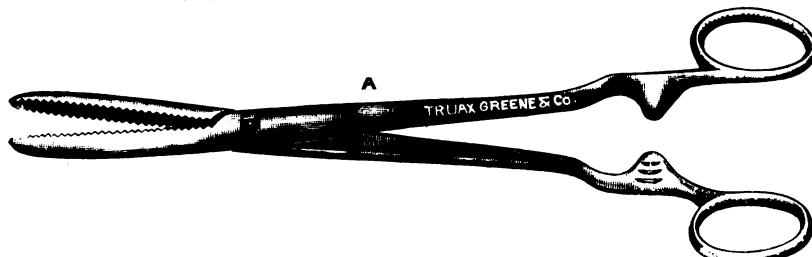
Helical needle.

One pedicle needle.

One Kocher's director.

One probe.

One tenaculum hook.



Long hemostatic forceps.

One blunt hook.

One hydrocele trocar.

Ligatures:

Catgut No. 2, twenty inches long, for pedicle needle
for double ligature, used to ligate the sac and



Hydrocele trocar.

the omentum when it is diseased or can not be
reduced. (Braided silk is sometimes used.)

Sutures:

Three cambric needles for braided silk No. 4 to
suture the intestine if resection is made.

Three small curved needles for catgut No. 3 to suture fascia of pectineus muscle to Poupart's ligament in femoral hernia.

(A hernial protrusion below Poupart's ligament constitutes a femoral hernia, which is more common in women.)

Three small round curved needles for catgut No. 2 to suture peritoneum.

Six glover's needles for silkworm gut for wound sutures.

Two glover's needles for horse hair for superficial sutures.

Dressing:

Iodoform and boric acid powder 1:5, with collodion dressing.

Sterilized sheets.

Towels.

Gauze sponges.

Gauze compresses.

Safety pins, bandages and cotton.

Bichlorid, alcohol, plenty of hot and cold sterilized water and physiologic solution for the hands.

Appendectomy.

(Excision of appendix vermiciformis for appendicitis).

Two scalpels.

Two tissue forceps.

Four hemostatic forceps, long.

Eighteen hemostatic forceps.

Three pairs scissors.

One needle holder.

One pedicle needle.

- One pair small retractors.
- One pair large retractors.
- One Kocher's director.
- One grooved director.
- One sharp spoon.
- Sterile toothpick tipped with cotton to apply 95 per cent. of carbolic acid to cauterize the mucous membrane of the stump of the appendix.
- Iodoform for the stump.

Ligatures:

- Catgut No. 2 or braided silk No. 5, 20 inches long, for pedicle needle, used to tie off the adhesions and the appendix.
- Catgut ten inches long, for single ligatures.



Ordinary director with tongue plate.

Sutures:

- Catgut No. 1 for cambric needle or braided silk No 4, used to bury the stump of the appendix by suturing over it the adjacent serous surfaces. For this purpose the purse-string suture of silk or catgut is now frequently resorted to.
(In all cases in which pus is found large fenestrated tubular drains must be kept in readiness.)
- Six glover's needles for silkworm gut for deep sutures.
- Two small round curved needles, for catgut No. 1 or fine silk for peritoneal sutures.
- Three surgeon's needles for catgut No. 3 to suture the fascia.

Two glover's needles for horse hair for superficial sutures.

Six glover's needles for silkworm gut for deep sutures.

Two small round curved needles in reserve.

Two rubber drains and narrow strips of iodoform gauze for capillary drainage.

Dressing, etc.:

Pure iodoform powder and salicylic acid and boric 1:4.

Iodoform gauze one-half yard.

Sterilized gauze one yard.

A large pad of sterilized cotton.

Two strips of adhesive plaster.

Abdominal bandage.

Perineal straps.

Twelve sterile towels.

Twelve sterile gauze compresses.

Twelve sterile safety pins.

Three sterile sheets.

One sterile laparotomy sheet.

Supply sterile gauze sponges.

Collodion in an aseptic glass and camel's hair brush.

Bichlorid solution 1:1000, alcohol and physiologic solution for the hands.

Cholecystenterostomy.

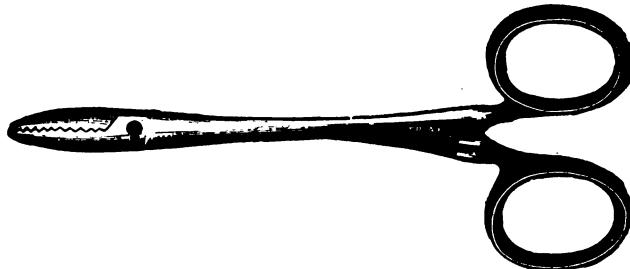
(Formation of a communication between the gall-bladder and the upper part of the small intestine.)

Two scalpels.

Two tissue forceps.

Two Billroth's hemostatic forceps.

Two long hemostatic forceps.
Eighteen hemostatic forceps.
Six Tait's hemostatic forceps.
Smallest Murphy button.
One needle holder.
One pair small retractors.
One pair large retractors.
Exploring syringe.
Large and small probes.
Fenestrated dull curette.
Small curved forceps.



Tait's hemostatic forceps.

Ligatures:

Catgut No. 2, ten inches long.

Sutures:

Three round curved needles for braided silk No. 7.

Three cambric needles for fine silk for fixation sutures.

Six surgeon's needles for silkworm gut for deep sutures.

Sterilized gauze, adhesive plaster, abdominal bandages, perineal straps, safety pins, sheets, towels, gauze compresses, gauze sponges.

Cholecystotomy.

(Opening the gall-bladder.)

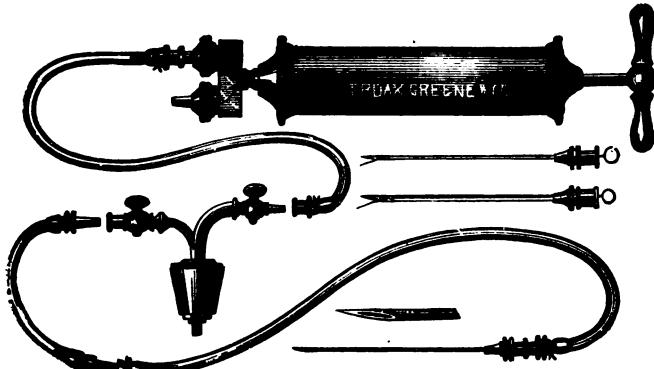
Cholecystotomy in two stages. In these cases the gall-bladder is anchored by suturing, with fine round

curved needles and braided silk No. 5, to the parietal peritoneum, and the wound tamponed with iodoform gauze. On the third day, adhesions having formed, the gall-bladder is opened and drained. It is well in every case of gall-bladder operation to prepare the following:

- One tenotomy knife.
- One small dull curette.
- One sharp curette.
- Rubber tubing for drainage.

Cholecystostomy.

(Formation of a biliary fistula for obstruction of cystic or common bile duct caused by biliary calculus, cicatricial stenosis or malignant diseases.)



Potain's aspirator.

Operation is performed frequently for the removal of gallstones. Preparation same as for cholecystenterostomy. In all operations upon the gall-bladder an exploring syringe and bottle aspirator should be kept in readiness and in good working order.

Cholecystectomy.

(Excision of gall-bladder.)

Requirements as for cholecystenterostomy minus the Murphy button and curettes, with the addition of one

pedicle needle and braided silk No. 8 or catgut No. 4 twenty-four inches long, two pedicle forceps and sterile toothpick with one point charged with pure carbolic acid.

CHAPTER IX.

Gynecological Operations.

Uterine Curettage.

(Scraping the interior of the uterus.)

- One small uterine dilator.
- One large uterine dilator.
- One sharp curette.
- One dull curette.
- One uterine sound.
- One uterine probe.
- One dressing forceps.
- One uterine applicator tipped with cotton.
- Two Sims' specula.
- One tenaculum forceps.
- One vulsellum forceps.
- One pair scissors.
- Two tenaculum hooks.
- One intra-uterine douche tube.
- Tincture of iodin, vaselin, glycerin, iodoform powder, iodoform gauze strips, sterile lamb's wool and cotton—either of the latter may be used for tampons.
- Corrosive sublimate solution 1:4000, boric acid solution 2 per cent.—one-half gallon each for irrigation.
- Gynecological drawers, Kelly apron, eight sterilized towels, three sheets, leg holders, sterile gauze sponges.

Caution.—The intra-uterine douche tube is a very useful though dangerous instrument in the hands of an unskilful nurse.

Preparation and Use.

- First—Boil for fifteen minutes in soda solution.
- Second—Expel the air by allowing the solution to run freely before inserting.
- Third—Do not insert beyond the shield.
- Fourth—Hold in position while using.
- Fifth—Use no force.
- Sixth—Attach a rubber tube to the back flow canula and provide a basin for the escaping fluid.

Perineorrhaphy and Trachelorrhaphy.

(Perineorrhaphy: Suture of the perineum.)

(Trachelorrhaphy: Suture of the cervix).

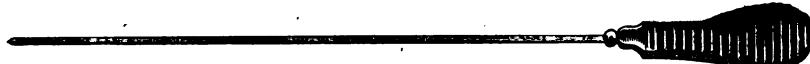
- Two scalpels.
- Two tissue forceps.
- Twelve artery forceps, Kocher's.
- One vulsellum forceps.
- One tenaculum forceps.
- One needle holder.
- Two tenaculum hooks.
- Two pairs scissors, straight and curved on the flat.
- One uterine dressing forceps.
- One uterine sound.
- One uterine douche tube.
- Two Sims' specula.

Ligatures:

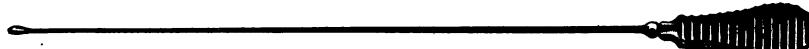
Catgut, fine and medium, ten inches long. If silk is called for give No. 5 and No. 7.



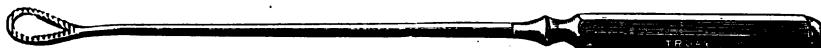
Tenaculum hook.



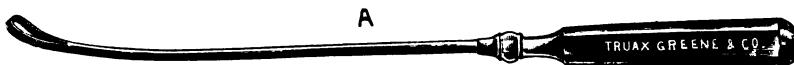
Emmet's plain applicator.



Sim's uterine probe.



Dull curette.



Curette.



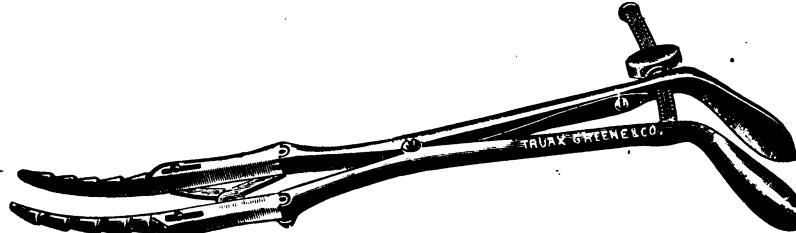
Munde's curette.



Simpson's uterine sound.



Leonard's dilating douche tip.



Goodell's uterine dilator.

Sutures:

Two Hagedorn needles (full curve) for braided silk

No. 8 for stay sutures.

Two surgeon's needles (full curve) for medium catgut.

Two curved round needles for medium catgut.

Three full curved Emmet's needles for catgut.

Three Emmet's needles, quarter curved, for silk-worm gut.

Bichlorid solution 1:4000 for irrigation.

Boric acid solution 2 per cent. for irrigation.

Vaseline (hand vaselin on an aseptic sponge).

Iodoform and boric acid 1:5.

Pure iodoform.

Dressing, etc.:

Five strips of iodoform gauze three inches in width.

Two strips of iodoform gauze eight inches in width.

Sterilized cotton.

"T" bandage.

Leg holders.

Eight sterilized towels.

Three sterilized sheets.

Sterilized gauze sponges.

Gynecological drawers.

If the leg holders are not convenient, fold a sheet in triangular shape, roll it towards the point, place under the knees of the patient, drawing them up, bring one end over the shoulder and under the opposite arm and tie.

After operation a towel should be pinned around the limbs to hold them in position.

These patients are confined to light diet for a few days.

Colporrhaphy.

(Suture of the vagina.)

Same preparation as for perineorrhaphy.

Vaginal Hysterectomy.

(Excision of uterus. Removal of uterus through the vagina).

One scalpel.

One bistoury.

Two tissue forceps.

Two vulsellum forceps, six pronged.

Two vulsellum forceps, two pronged.

Two vulsellum forceps, four pronged.

Eight clamp forceps, eight inches.

Eight Kocher's artery forceps.

Four long curved artery forceps, Pean's.

Three long curved artery forceps, Spencer Wells'.

One uterine dressing forceps.

One pair vaginal retractors.

One pair scissors, curved, blunt pointed.

One pair scissors, curved, sharp pointed.

One pair scissors, straight.

Two Sims' specula in reserve.

Two tenaculum hooks.

One pedicle needle.

One Sims' self-retaining catheter.

One elastic rubber catheter.

Ligatures:

Catgut No. 4 and No. 5, twenty-four inches long.
for two pedicle needles for double ligature.

Catgut No. 2 and No. 3, ten inches long, for single
ligatures. If silk is called for give No. 7 or
No. 8, same length.

Sutures may be required. Prepare round curved needles, small, medium and large for catgut.

Dressing, etc.:

Six strips of iodoform gauze eight inches in width.

Three strips of iodoform gauze three inches in width.

Sterilized cotton.

Hygroscopic gauze.

"T" bandage.

Gynecological drawers.

Three sheets.

Eight towels.

Gauze sponges.

Kelly pad.

Leg holder.

Solutions:

Boric acid 2 per cent., bichlorid 1:400—one-half gallon of each for irrigation.

Oophorectomy or Salpingo-Oophorectomy.

(Excision of Fallopian tube and ovary for pyosalpinx).

Pyosalpinx.—Pus in the Fallopian tube, hydrosalpinx—water in the Fallopian tube. Ovarian tumor—solid, cystic or dermoid. Hysteropexy: abdominal fixation of uterus.

Two scalpels.

Two tissue forceps.

Six long hemostatic forceps.

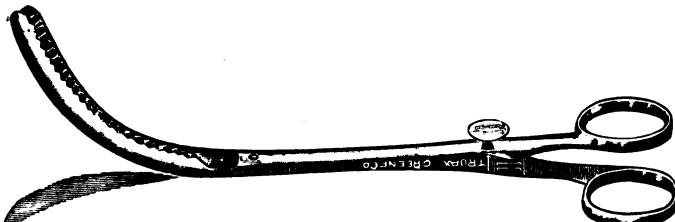
Twenty-four hemostatic forceps.

One needle holder.

Two curved pedicle forceps.

Two vulsellum forceps, two pronged.

- One "T"-shaped artery forceps.
- One pedicle needle.
- One Kocher's director.
- One grooved director.
- One exploring syringe.
- One bottle aspirator.
- Rubber drains.



Williams' full-curved pedicle forceps.



Large trocar.



Senn's bullet forceps.

- Two glass drains (Keith's) lightly packed with a strip of iodoform gauze.
- Three pairs scissors.
- One pair deep retractors.
- One pair small retractors.
- One small probe.

Ligatures:

Catgut No. 2, ten inches long, for single ligatures.

Catgut No. 4 and No. 5, twenty-four inches long,
for pedicle needle for double ligatures. (If
braided silk is called for give No. 8 the same
length.)

Sutures:

Six glover's needles for silkworm gut for deep
sutures.

Two round curved needles for catgut No. 1 or fine
silk for peritoneal sutures.

Two surgeon's needles for catgut No. 3 for fascia
sutures.

Two glover's needles for horsehair for skin
sutures.

Two cambric needles and two small round curved
needles in reserve.

Dressing, etc.:

Iodoform and boric acid powder 1:5.

Pure iodoform powder.

One-half yard iodoform gauze.

One yard sterile gauze.

Pad of sterile cotton.

Adhesive plaster strips.

Abdominal bandage.

Perineal straps and safety pins.

Twelve sterilized towels.

Twelve sterilized gauze compresses.

Three sterilized sheets.

One sterilized laparotomy sheet.

For ovarian tumor prepare one ovarian trocar with
rubber tubing attached and two cyst holding forceps
(Senn's bullet forceps).

Abdominal Hysterectomy or Hysteromyomectomy.

(Removal of the body of the uterus for myoma by the abdominal route.)

Hysterectomy for carcinoma of the uterus is performed either through the abdomen or both operations are combined. Requirements as for the preceding case minus the trocar, with the addition of the following:

Four cambric needles for catgut No. 4.

Three large round curved needles for catgut No. 4.

Four long straight hemostatic forceps.

Four long curved hemostatic forceps.

Aseptic rubber cord or tubing for uterine constrictor.

Myomectomy.

(The removal of a uterine tumor by enucleation either by the vaginal or abdominal route.)

Preparation the same as for Cesarean section minus the obstetrical appliances.

Cesarean Operation.

(Removal of usually living child by abdominal incision.)

The Porro operation accomplishes the same, but includes at the same time the supra-vaginal removal of the uterus.

Two scalpels.

Two tissue forceps.

Two hemostatic forceps, long.

Twenty-four hemostatic forceps.

Six hemostatic forceps (Tait's).

One "T"-shaped artery forceps.

Two pedicle forceps.

One pedicle needle.

One needle holder.

One pair retractors, large.

One pair retractors, small.

One Kocher's director.



Vaginal retractor.

One grooved director.

One elastic constrictor of rubber cord or tubing.

Three pairs scissors.

One uterine dressing forceps.



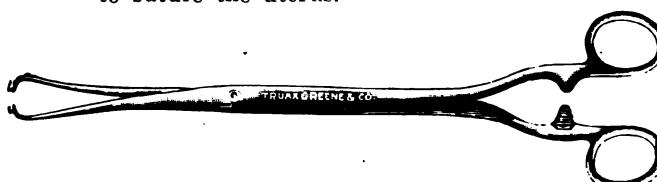
Bozeman's dressing forceps.

Ligatures:

Catgut No. 2 and No. 3 ten inches long.

Sutures:

Three cambric needles for catgut No. 4 or fine silk to suture the uterus.



Bullet forceps or double tenaculum.

Three large curved round needles for catgut No. 4.

Six glover's needles for silkworm gut for deep sutures.

Two glover's needles for horsehair for superficial sutures.

Two round curved needles for catgut No. 1 or fine silk to suture the peritoneum.

Two surgeon's needles for catgut No. 3 to suture the fascia.

Two fine round curved needles and two fine cambric needles in reserve.

One-half yard of braided silk to tie the umbilical cord.

Fluid extract of ergot, olive oil, toilet powder and a warm blanket.

Dressing:

Iodoform and boric acid powder 1:5 or salicylic and boric acid 1:4.

One-half yard iodoform gauze.

Pad of cotton.

One-half yard of sterile gauze.

Adhesive plaster.

Abdominal bandages.

Perineal straps.

Collodion in an aseptic glass and camel's hair brush.

Twelve sterilized towels.

Twelve sterilized safety pins.

Twelve sterilized laparotomy sponges.

Supply of sterilized gauze sponges.

Three sterilized sheets.

One sterilized laparotomy sheet.

Perineal dressing consists of narrow strips of iodoform gauze, eight-inch strip of sterile gauze, cotton and "T" bandage. Corrosive sublimate solution 1:1000,

alcohol and plenty of hot saline solution, for hand and surface disinfection.

Obstetric Notes.

Promptitude in Answering a Call.

"It is during the first stage of labor that the nurse is likely to be summoned, and she should answer the call as promptly as possible so as to have time to make all necessary preparation for the birth of the child without hurry." (Clara Weeks.)

Nurse's Obstetrical bag should contain:

Thermometers (clinical and bath).

Ether cone.

Hypodermic syringe.

Medicine dropper.

Graduated medicine glass.

Glass and rubber catheter.

Fountain syringe.

Scissors and forceps.

Bottle of bichlorid tablets.

Small bottle of acetic acid.

Boric acid, two ounces.

Carbolic acid.

Small package of absorbent cotton.

Braided silk tape or cord.

Safety pins, two sizes.

Sterile gown.

If previous arrangements have been made with the expectant mother, the nurse will frequently be asked to make out a list of the needed articles so that ample provision may be made. The following list contains the essential articles, but a more ample one according to the means or taste of the individual may be given:

For the baby will be needed—

Blanket.

Pair of round pointed scissors, not too sharp, to cut the umbilical cord, and tape or braided silk with which to tie it (heavy Chinese silk is the best).

Bottle of olive oil.

Castile soap.

Absorbent cotton.

Small soft sponge.

Box of talcum powder.

Four dozen cotton diapers in four sizes.

Four flannel bands, eighteen inches long and about six inches wide.

Four long-sleeved flannel shirts.

Six flannel skirts.

Eight plain slips.

Several soft blankets.

Two dozen nickel-plated safety pins.

For the mother:

Four or six plain night dresses.

One or two flannel wrappers of light material.

Pound of absorbent cotton.

Pound of ordinary cotton batting.

Six or eight yards of antiseptic gauze.

Four or six strong unbleached muslin bandages.

Rubber sheet.

For the doctor:

A supply of clean towels.

A sterile new nail brush.

Soap and hot and cold water.

Ice.

Three basins.

Bed-pan.

Fountain syringe.

Sterile glass catheter.

Brandy, ergot, chloroform, ether, carbolic acid and bichlorid solution.

The parturient woman must be regarded in the light of a surgical case and everything that is brought in contact with the genitals must be aseptic. Hand disinfection and the use of sterile absorbent dressings are as important here as in the treatment of wounds.

CHAPTER X.

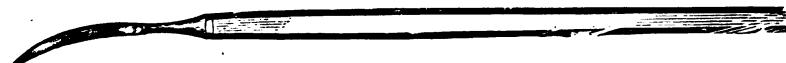
Opening of an Abscess.

(An abscess is a circumscribed cavity containing the fluid product of suppurative inflammation.)

The nurse must here remember the aseptic precautions to be observed in order to prevent further infection or mixed infection, therefore disinfect the skin sufficiently far beyond the line of incision.

Instruments:

One scalpel.



Bistoury.

One bistoury.

One tissue forceps.

One probe.

One sharp spoon.

One pair scissors.

Three hemostatic forceps.

One glass syringe.

Peroxid of hydrogen, bichlorid 1:3000 for irrigation.

Fenestrated rubber drains.

Safety pins.

If it is a tubercular abscess prepare iodin solution sherry color (tincture of iodin one dram to water one quart).

Dressing, etc.:

A heavy compress of hygroscopic gauze moist with saturated solution of acetate of aluminum, hot.

Waxed paper or oiled linen, cotton bandages, safety pins.

Wounds that suppurate profusely are dressed every day and sometimes twice a day.

Heat and moisture in the form of hot antiseptic fomentations relieve pain, reduce swelling and inhibit suppuration. The antiseptic hot compress has almost entirely taken the place of the old-fashioned filthy poultice.

Operation for Hare-Lip.

(Hare-lip: Congenital fissure of lip.)

If the operation is performed without an anesthetic, the child's arms must be fastened to the sides of the body with a towel or a broad bandage held in place with safety pins.

One tenotome.

One scalpel.

One needle holder.

One Kocher's director.

One probe.

One pair sharp retractors.

Two tissue forceps.

Two tenaculum hooks.

Two blunt hooks.

Two pairs of scissors.

Six artery forceps.

Sutures:

Three surgeon's needles for catgut No. 1.

Three glover's needles for silkworm gut.

Three glover's needles for horsehair.
Narrow strip of iodoform gauze.
Narrow strip of adhesive plaster.
Cotton, collodion in an aseptic glass, camel's hair
brush, safety pins, one-inch roller bandage, six
towels, gauze sponges.

Cheiloplasty.

(Plastic operation on cheek.)

Same preparation as for hare-lip.

Rhinoplasty.

(Plastic operation on the nose.)

Two scalpels.
Two tissue forceps.
Twelve hemostatic forceps.
One tenotomy.
One Kocher's director.
One grooved director.
One probe.
One pair sharp retractors, three pronged.
One pair sharp retractors, six pronged.
One pair scissors, straight, blunt pointed.
One pair scissors, curved, sharp pointed.
One pair scissors, small.
One needle holder.

Ligatures:

Catgut, fine and medium, ten inches long, for single
ligatures.

Sutures:

Three surgeon's fine needles, full curved, for fine
catgut if buried sutures are required.

Three surgeon's medium-sized needles for medium-sized braided silk for tension sutures.

Three surgeon's needles for silkworm gut for flap sutures.

Four glover's needles for silkworm gut.

Two glover's needles for horsehair for superficial sutures.

If the surgeon takes the flap from the forehead, prepare silver wire, lead plates, perforated shot, forceps to crush the lead plates (sequestrum forceps), razor and two Tait's forceps, with two cambric needles used to spread the grafts. The arm or thigh of the patient is prepared according to the method given for surface disinfection before operation.

When the flaps are taken from the cheek the skin grafting appliances are not necessary.

Dressing, etc.:

The usual dressing for the nose consists of a salt solution compress.

Gutta-percha tissue.

Absorbent cotton.

Bandage.

Safety pins.

The wound from which the grafts are taken is dressed according to the method given for the skin-grafting operation.

Twelve towels.

Steel gauze sponges.

Eight-inch compresses.

Absorbent cotton.

Narrow strips of iodoform gauze.

Amputation of Breast.

Two scalpels.
Two tissue forceps.
One needle holder.
One aneurysm needle.
One pair sharp retractors.
One pair deep retractors.
One Kocher's director.
Three pairs scissors.
Twenty-four hemostatic forceps.

Ligatures:

Catgut No. 2 and No. 3 ten inches long.

Sutures:

Two surgeon's needles for catgut No. 2 for buried sutures.



Volkmann's retractor.

Three large curved surgeon's needles for silk No. 3 for tension sutures.

Six glover's needles for silkworm gut.

Three glover's needles for horsehair.

Two fenestrated drainage tubes the size of the little finger and eight inches in length.

Gutta-percha tissue in $2\frac{1}{2}$ per cent. carbolic acid solution.

Dressing, etc.:

Boric acid and salicylic acid 1:4.

Three strips of iodoform gauze three inches in width.

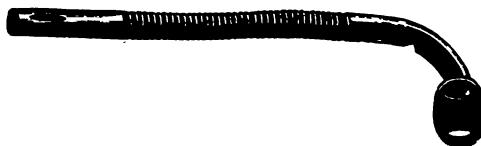
Three strips of iodoform gauze eight inches in width.

Six strips sterilized gauze eight inches in width.
Collodion in an aseptic glass and camel's hair brush.
One yard of sterilized gauze, large pad of cotton.
Two gauze roller bandages four inches wide and
three yards in length.
Twelve sterilized towels.
Twelve sterilized safety pins.
Six sterilized gauze compresses.
A supply of gauze sponges.
Plenty of hot and cold saline solution.

Tracheotomy.

(Incision of the trachea.)

Two scalpels.
Two tissue forceps.
Two tenaculum hooks.



Long trachea tube.

Two blunt hooks.
Two pairs of scissors.
One tracheotomy tube.
One pair three-pronged retractors.
One probe.
One grooved director.
Six hemostatic forceps.

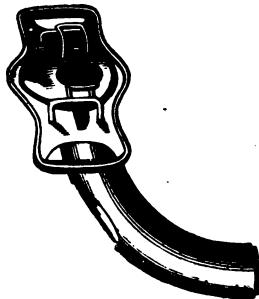
Sutures:

Two surgeon's needles for catgut No. 2.
Two glover's needles for silkworm gut.

Dressing, etc.:

Protective silk or gutta-percha tissue 4x4.

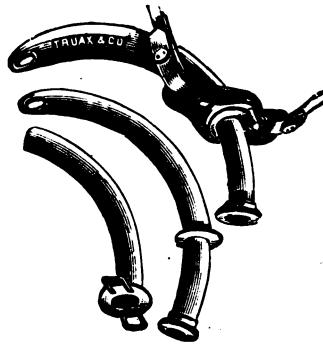
Iodoform and boric acid powder 1:5.
Two narrow strips of iodoform gauze.
One eight-inch strip of hygroscopic gauze.
Two-inch cotton roller bandage.



Trousseau's trachea tube.

Gauze sponges.

Two pieces of narrow tape, each 11 inches long.
Attach one strip to each side of the tracheotomy tube and tie around the neck to hold the tube in position. The outer tube should not be removed



Cohen's trachea tube.

by the nurse; but she removes the inner one every hour or oftener, if so directed by the physician. The movable or inner tube should be washed in a solution of salt water (one dram of salt to a pint

of water), and swabbed out with a chicken feather or cotton mop which has been sterilized. Before replacing the inner tube, the tube in the trachea should be cleansed also. This is done to remove the mucus that collects in and around the tube, thus rendering free the entrance and escape of air.

The temperature of the tracheotomy room must not be less than 80 degrees F., and the atmosphere should be saturated with steam.

Adenectomy.

(Excision of diseased lymphatic glands; it here refers to tubercular glands of the neck.)

Two scalpels.

Two tissue forceps.

Two blunt hooks.

Two tenaculum hooks.

Twelve artery forceps.

One pair scissors, straight, blunt pointed.

One pair scissors, curved, blunt pointed.

One pair scissors, curved sharp pointed.

One pair of sharp retractors.

One pair of blunt retractors.

One artery needle (aneurysm needle).

One probe.

One Kocher's director.

One grooved director.

One needle holder.

Ligatures:

Catgut No. 1 and No. 2 ten inches long.

Aneurysm needle for catgut No. 2 twenty inches long, for ligation of large blood vessels.

Braided silk may be required.

Sutures:

- Three large, curved, round needles for catgut No. 4
for muscle suture.
- Two surgeon's needles for catgut No. 2.
- Six glover's needles for silkworm gut.
- Two glover's needles for horsehair.
- Two fine, round, full curved needles in reserve.

Dressing, etc.:

- Iodoform and boric acid powder 1:5.
- Three strips of iodoform gauze three inches in width.
- Three strips of iodoform gauze eight inches in width.
- Six strips of hygroscopic gauze eight inches in width.
- Fenestrated rubber tubes for drains.
- Three-inch strip of iodoform gauze for capillary drainage.
- One-half yard of sterilized gauze.
- Large pad of sterilized cotton.
- Two aseptic gauze roller bandages.
- Two plaster-of-paris roller bandages.
- Three sterilized sheets.
- Roll of sterile absorbent cotton.
- Six sterilized gauze compresses.
- Ample supply of sterilized sponges.
- Silk protective or gutta-percha tissue.
- Twelve sterilized safety pins.
- Iodoform glycerin emulsion, 10 per cent., collodion in an aseptic glass and camel's hair brush.
- Hot and cold salt solution.

Rectal Fistula.

(Abnormal tube-like passage about the anus giving vent to pus or other secretions.)

Select and prepare the following instruments:

- One scalpel.
- One bistoury.
- One small Sims' speculum.
- One rectal speculum.
- One probe.
- One grooved director.
- One pair sharp retractors.
- One pair blunt retractors.
- One sharp spoon.
- One needle holder.



Probe-pointed director.

- Two pairs scissors.
- Two tissue forceps.
- Six hemostatic forceps.
- One glass syringe for peroxid of hydrogen.
- Boric acid or Thiersch's solution for irrigation.
- Kelly apron.
- Gynecological drawers.
- Pacquelin cautery.
- Leg holders.

Ligatures:

- Catgut No. 2.

Sutures:

- Two small fistula needles for catgut No. 1.

Three surgeon's needles for catgut No. 2.

Three surgeon's needles for silkworm gut.

Dressing, etc.:

Iodoform and boric acid powder 1:5.

Six iodoform gauze strips.

Cotton, "T" bandage, safety pins, six towels, three sheets and gauze sponges.

Operation for Hemorrhoids by the Use of the Clamp and Cautery.

(Hemorrhoids: Swellings caused by varicose hemorrhoidal veins.)

One small Sims' speculum.

One pile clamp (Adams').

One pair scissors, blunt pointed.

Four Kocher's artery forceps.

Pacquelin cautery in good working order.

Rectal tampon.

This tampon is made of a piece of rubber tubing the size of thumb and twelve inches in length. Into this tube is inserted a glass cylinder three to four inches in length. An umbrella of iodoform gauze is fastened to the tube by tying a silk ligature over it at a point corresponding with the glass cylinder. Strips of iodoform gauze are used in packing the space between the tube and umbrella or mantle of gauze, after the tube has been inserted into the rectum.

Vaseline, iodoform gauze strips three and eight inches in width, cotton, "T" bandage, gynecological drawers.

Leg holders.

Kelly apron.

Boric acid or Thiersch's solution for irrigation.

Six sterilized towels.

Gauze sponges.

The rectal tampon is removed forty-eight hours after operation. During this time the patient is kept on liquid diet. In removing the tube traction is made on the mantle of iodoform gauze until the packing is brought within easy reach when it is removed with forceps, then the tube can be extracted without causing any pain.

Bowels not to be evacuated for perhaps four days.

Operation for Phimosis.

(Circumcision.)

One scalpel.

One tissue forceps.

One needle holder.

One probe.

Two pairs scissors.

Three hemostatic forceps.

Sutures:

Two fine surgeon's needles for catgut No. 1.

Two cambric needles in reserve.

Dressing, etc.:

Iodoform and boric acid powder 1:5.

Vaseline.

Narrow strips of iodoform gauze.

Aseptic cotton.

Collodion.

Strip of adhesive plaster one-half inch in width
and seven inches long.

Towels and gauze sponges.

Varicocele.

(Dilation of the spermatic veins.)

Two scalpels.

Two tissue forceps.

Four hemostatic forceps.
One pair sharp retractors.
One pair blunt scissors.
One needle holder.
One aneurysm needle.
Kocher's director.
One grooved director.
One blunt hook.

Ligatures:

Aneurysm needle for catgut No. 2 fifteen inches long to ligate dilated veins. This is called a double or mounted ligature.

If braided silk is called for give No. 5 or No. 7.

Sutures:

Two surgeon's needles for catgut No. 2.
Six glover's needles for silkworm gut.
Two glover's needles for horsehair.

Dressing, etc.:

Iodoform and boric acid powder 1:5.
Narrow strips of iodoform gauze.
Sterilized cotton.
Sterilized gauze sponges.
Four sterilized towels.
Three sterilized sheets.
Collodion in an aseptic glass and camel's hair brush.
Bichlorid and saline solution.
Gauze roller bandage.
Two strips of adhesive plaster two inches wide and twenty-four inches long.
Gutta-percha tissue.

Skin Grafting.

This operation consists in transplanting living skin to cover cutaneous defects caused by injury, operation or disease. Three methods are employed:

First—Reverdin's, small grafts of the cuticle only.

Second—Thiersch's, larger grafts including entire thickness of true skin.

Third—Wolfe's large grafts of skin devoid of subcutaneous fat.

Fourth—Krause's, large grafts with underlying fat tissue.

Carefully disinfect the skin from which grafts are to be taken.

Prepare an aseptic razor.

One sharp curette if grafting is to be done on a granulating surface.

Two artery forceps.

Two cambric needles.

The wounds to which grafts are applied should be dressed with narrow strips of gutta-percha tissue rendered aseptic by washing with soap and water and immersing in solution of bichlorid 1:1000 for twenty-four hours. One-half hour before applying dry with aseptic gauze and place in a solution of sodium chlorid 6/10 per cent.

Sterilized gauze, cotton, roller bandage and safety pins.

Note.—Great care must be taken in applying the bandage. If too much pressure is put on the grafts they will die. These wounds are sometimes dressed with a light compress of sterilized gauze saturated with a warm physiologic solution of salt over which gutta-percha tis-

sue is applied. Always have a quart of this solution in a basin for the surgeon to dip the razor in before cutting the grafts.

In Wolfe's and Krause's methods a sharp scalpel and dissecting forceps must be kept in readiness.

Excision of Varicose Veins.

(Dilatation of veins.)

Esmarch's constrictor.

Two scalpels.

Two tissue forceps.

Six hemostatic forceps.

Two tenaculum hooks.

Two blunt hooks.

One needle holder.

One artery (aneurysm) needle.

One probe.

One Kocher's director.

One pair sharp retractors.

One pair blunt retractors.

Two pairs scissors.

Ligatures:

Catgut No. 2 twenty inches long, for aneurysm needle to ligate the veins.

Catgut No. 2 ten inches long, for single ligatures.

Braided silk No. 5 may be required.

Sutures:

Two surgeon's needles for catgut No. 2 for buried sutures.

Six glover's needles for silkworm gut.

Two glover's needles for horsehair.

Two small round curved needles in reserve.

Dressing, etc.:

Boric acid and salicylic acid powder 1:4.

Two-inch strip of iodoform gauze, laid over the wound and sealed with collodion. Place over this a thin layer of sterile cotton and seal, over the seal a small dressing of sterile gauze loosely applied. Cover with a large pad of sterile cotton.

Two gauze roller bandages.

Posterior hollow splint, well padded.

Twelve sterilized towels.

Twelve sterilized safety pins.

Two sterilized sheets.

Sterilized gauze sponges.

Bichlorid solution 1:1000, alcohol, hot and cold physiologic solution.

The limb is kept in an elevated position until the wound is healed.

Nephropexy.

(Nephropexy: Fixation of the kidney. Nephorrhaphy: Suture of the kidney.)

Two scalpels.

Two tissue forceps.

Two Senn's bullet forceps.

Four artery forceps.

Three pairs scissors.

One needle holder.

One pair small retractors.

One pair large retractors.

One Kocher's director.

Sutures:

Three round curved needles for catgut No. 5 or silk as the surgeon may direct with which to suture the kidney.

Two glover's needles for silkworm gut.

One glover's needle is used to scarify the kidney.

A hard circular pillow, two feet in length, eighteen inches in circumference, covered with white rubber and sterile towel.

Small pad four inches long, three inches wide and three inches thick, made of a towel or gauze, to be placed under the kidney in front when dressing is applied.

Dressing, etc.:

Six three-inch strips of iodoform gauze for tamponing the wound.

One-half yard of iodoform gauze.

Three yards of sterile gauze.

Large pad of sterile cotton.

Two gauze roller bandages.

Two strips of adhesive plaster two inches wide and long enough to encircle the body.

Eight sterile towels.

Eight sterile safety pins.

Three sterile sheets.

Nephrectomy.

(Excision of the kidney.)

Same preparations as for nephorrhaphy with the addition of two hemostatic forceps (long), straight and curved and artery needle for strong silk with which to tie the pedicle, exploring syringe and Pacquelin cautery.

Resection of Rib for Empyema.

(Pus in the pleural cavity.)

The following instruments are required:

Two scalpels.

Two tissue forceps.

Two artery forceps, long.
Six artery forceps.
One bone-cutting forceps.
One holding forceps (lion-jaw).
One periosteal elevator.
One probe.
One Kocher's director.
One grooved director.
Two pairs scissors.
One exploring syringe.
Two large rubber tubular drains.

Dressing, etc.:

Iodoform and boric acid powder 1:5.
Narrow strips of iodoform gauze.
One eight-inch strip of iodoform gauze.
One-half yard of iodoform gauze.
Three yards of sterilized gauze.
Large cushion of sterilized cotton.
Two gauze roller bandages.
One rubber webbing bandage two inches wide and
four yards long.
Ligatures may be required.

Sutures, etc.:

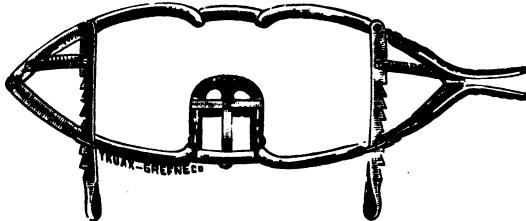
Two surgeon's needles for silkworm gut.
Two glover's needles.
Six towels.
Three sheets.
Gauze sponges.

Staphylorrhaphy.

(The suture of cleft-palate, congenital palatine fissure, groove
or cleft.)

Whitehead's gag.
One tenotomy.

- One staphylorrhaphy knife, double edge, sharp point.
- One staphylorrhaphy knife, double edge, probe point.
- One staphylorrhaphy knife, curved, probe point.
- One staphylorrhaphy needle.
- One staphylorrhaphy hook.
- One needle holder.
- One tenaculum hook.
- One blunt hook.
- One periosteal elevator, curved.



Whitehead's gag.

- Two tissue forceps.
- Two pairs scissors.
- Six hemostatic forceps.
- Six sponge holders.
- Two lead discs for tension suture.
- Silver wire and silk suture.
- Two staphylorrhaphy needles with handles.
- One Kocher's director.
- One probe.
- A supply of small sponges.
- Narrow strips of iodoform gauze.
- Saturated solution of boric acid for disinfection of mouth.

Amputation of Leg.

- Esmarch's constrictor.
- Two scalpels.
- One amputating knife.
- One Catlin knife (this is used only for amputations below the knee and elbow).
- Two tissue forceps.
- Twelve hemostatic forceps.
- One bone-cutting forceps.
- One periosteal elevator.
- One Butcher's amputation saw.
- One pair retractors.
- One pair retractors, gauze.
- One pair straight scissors.
- One pair curved scissors.



Amputating knife.

Ligatures:

Catgut No. 1 and No. 2 ten inches long.

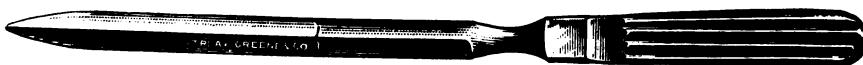
Sutures:

- Two surgeon's needles for catgut No. 2 for buried sutures.
- Two surgeon's needles for catgut No. 3 to suture the muscles.
- Six glover's needles for silkworm gut to suture the flaps.
- Two glover's needles for horsehair for superficial sutures.
- Fenestrated rubber tube for drain.

Dressing, etc.:

- Boric acid and salicylic acid powder 1:4.
- Three-inch strips of iodoform gauze.

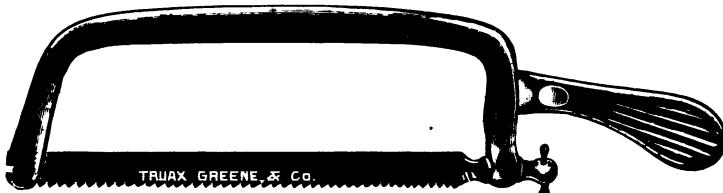
One-half yard of iodoform gauze.
 Two yards sterilized gauze.
 Large pad sterilized cotton.
 Two gauze roller bandages.
 Twelve sterilized towels.
 Twelve sterilized safety pins.
 Three sterilized sheets.



Liston's catlin.

A supply of sterilized gauze compresses.
 A supply of sterilized gauze sponges.
 Well-padded hollow posterior splint.
 The limb must be placed in an elevated position at an angle of at least 45 degrees for two days or more.

In this or any other case when the blood soaks through the dressing and bandage, dust over the blood stains with



Butcher's saw.

boro-salicylic powder and apply a pad of cotton and bandage. This will prevent the germs from getting into the wound through the wound secretion in the moist part of the dressing, which is a good culture medium for microbes.

Esmarch's constrictor is used when the surgeon wishes to do a bloodless operation and for cases of secondary hemorrhage. The limb is rendered bloodless by eleva-

tion for a few minutes. Apply the constrictor high up on the limb where the blood vessels and nerves are protected by a thick cushion of muscles, and over several thicknesses of an aseptic towel. Under no circumstances should the constrictor be left on the limb longer than three hours, as there is danger of gangrene resulting from the blood supply being cut off too long from the tissues.

Perineal Lithotomy.

(Incision into the bladder through the perineum for stone.)

One scalpel.

One bistoury, probe pointed.

Two tissue forceps.

Two artery forceps eight inches long.

Six artery forceps, Kocher's.

One Thompson's searcher.

One Wheelhouse staff.

Two lithotomy forceps.

Three lithotomy staffs.

One stone-crushing forceps or a lithotrite.

One scoop and guide.

One Kocher's director.

One grooved director.

One needle holder.

One pair scissors, curved, blunt pointed.

One pair scissors, curved, sharp pointed.

One pair scissors, straight.

One pair sharp retractors.

One pair blunt retractors.

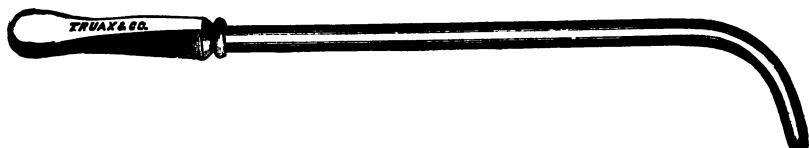
One blunt hook.

One tenaculum hook.

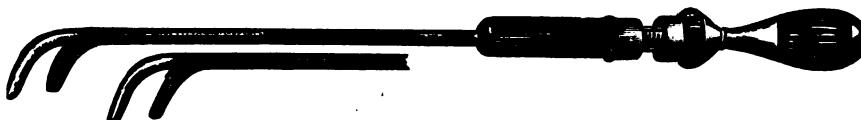
One probe.



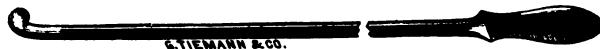
Thompson's stone searcher.



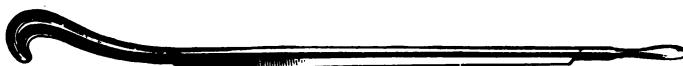
Van Buren's curved sound.



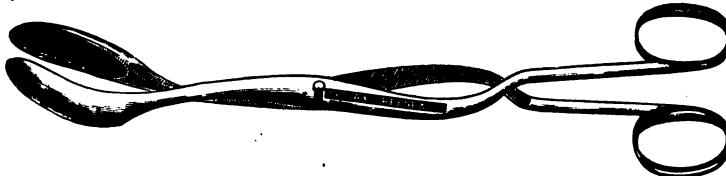
Bigelow's lithotrite.



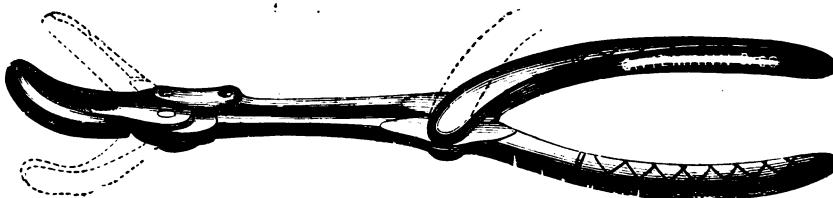
Wheelhouse's staff.



Little's director and scoop.



Little's curved stone forceps.



Gouley's double-lever lithoclast.

Three steel sounds.
One silver catheter.
Three soft rubber catheters Nos. 7, 9 and 11.
(Nélaton).
One Thompson's bulb.
One large rubber drain not fenestrated.
Large safety pins.

Ligatures:

Catgut No. 2 and No. 3 ten inches long. If braided silk is called for give No. 5 ten inches long.

Sutures:

Two surgeon's needles for silkworm gut.
Two round curved needles for catgut No. 2.
Two small curved needles for braided silk in reserve.
Boric acid solution 2 per cent. for irrigation.

Dressing, etc.:

Iodoform and boric acid powder 1:5.
Iodoform gauze strips three inches in width.
Iodoform gauze strips eight inches in width.
Sterilized cotton, aseptic gauze and "T" bandage.
Eight sterilized towels.
Three sterilized sheets.
Gauze sponges.
Gynecological drawers.

Suprapubic Lithotomy.

(Incision above pubes into the bladder for stone.)

Requirements as for perineal lithotomy minus the staffs, with the addition of Senn's sigmoid catheter and rubber tubing attached, Thompson's bulb, rectal bag and the usual abdominal dressing and two long strips of adhesive plaster.

CHAPTER XI.

Excision of Maxilla — Upper and Lower.

(Maxilla, the jaw.)

- Two scalpels.
- Two tissue forceps.
- Two artery forceps, long.
- Two bone-cutting forceps, large.
- One bone-holding forceps, (lion-jaw).
- Eighteen artery forceps.
- One periosteal elevator.
- One cross-cutting bone forceps.
- One probe.
- Two sharp spoons.
- Two blunt hooks.
- Two tenaculum hooks.
- Two pairs retractors, sharp and blunt.
- Three pairs scissors.
- One chain saw.
- One mallet.
- One gouge.
- Two chisels.
- One Kocher's director.
- One grooved director.
- Two tooth forceps, incisor and molar.
- One vulsellum forceps.
- Pacquelin cautery.

Ligatures:

Catgut No. 1 and No. 2 ten inches long.

Sutures:

Two surgeon's needles for catgut medium for muscle-sutures.

Two surgeon's needles for catgut fine to suture the mucous membrane.

One surgeon's large curved needle for silk No. 8 for the tongue.



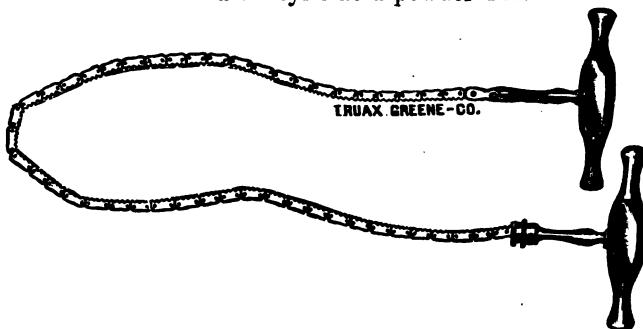
Fergusson's lion-jawed forceps.

Six glover's needles for silkworm gut for the flap.

Two glover's needles for horsehair for superficial sutures.

Dressing, etc.:

Boric acid and salicylic acid powder 1:4.



Chain saw.

Mikulicz's drain, a square of gauze 12x12 inches.

Rubber tubing and narrow strips of gauze for drainage.

Iodoform gauze one-half yard.

One yard of sterile gauze.

One ounce of compound tincture of benzoin.

Large pad of cotton and two gauze roller bandages.
 Twelve sterilized towels.
 Twelve sterilized safety pins.
 Three sterilized sheets.
 Sterilized gauze compresses.
 Sterilized gauze sponges.

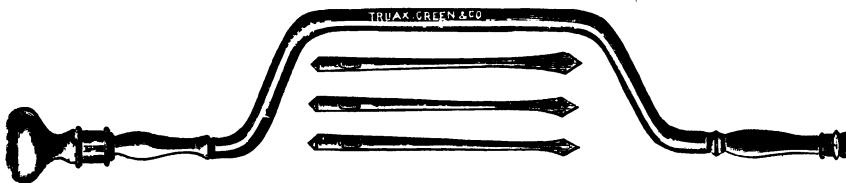
Cranial Osteotomy.

(Opening of skull for cerebral hemorrhage, tumor of the brain or fracture of the skull, or epilepsy.)

Cranieotomy.

(Resection of part of skull.)

Instruments, etc., as for excision of maxilla, minus



Langenbeck's drills.

bone-holding forceps, chain saw, vulsellum forceps and Mikulicz's drain, with the addition of the following:

- One tenotomy knife.
- One needle holder.
- One De Vilbiss bone-cutting forceps.
- One large trephine.
- One small trephine.
- One bone drill.
- One foot of silver wire to serve as an electrode for the galvanic battery, which is sometimes used when the operation is for epilepsy.
- Wilson's cyrtometer.
- Tincture of iodin and a probe tipped with cotton.

Physiologic solution at a temperature of 100 degrees F. in which to preserve bone temporarily removed.

Ligatures:

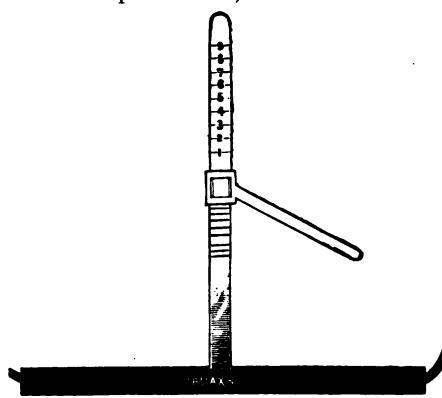
Catgut No. 1 eight inches long or braided silk No. 4.



DeVilbiss' cranial forceps.

Sutures:

Two small round curved needles for catgut No. 1 to suture the dura mater (outer membrane of brain and spinal cord).



Wilson's cyrtometer.

Two surgeon's needles for catgut No. 1 for periosteal sutures.

Two glover's needles for silkworm gut for flap sutures.

Two glover's needles for horsehair for superficial sutures.

A bundle of catgut or horsehair is sometimes used for drainage.

Collodion in an aseptic glass and camel's hair brush.

Two plaster-of-paris bandages (immerse one roll at a time).

Protective silk or gutta-percha tissue and a copius aseptic absorbent dressing.

Hot physiologic solution of salt is sometimes called for with which to arrest troublesome capillary hemorrhage.

Sequestrotomy.

(Operation for the removal of a sequestrum, fragment of necrosed bone.)

Esmarch's constrictor.

Two scalpels.

Two tissue forceps.

Twelve hemostatic forceps.

One sequestrum forceps.

One bone-cutting forceps.

One periosteal elevator.

One sharp spoon, small.

One sharp spoon, medium.

One sharp spoon, large.

Two gouges (round chisel).

Two chisels.

One mallet.

One Kocher's director.

One grooved director.

Two probes, long and short.

One pair sharp retractors.

One pair blunt retractors.
One pair scissors, curved, blunt.



One pair scissors, straight.
One glass syringe for peroxid of hydrogen.
Bichlorid solution 1:3000.



Macewen's gouge.

Decalcified bone chips. Place the chips on sterile gauze and dust with iodoform powder before handing to the surgeon.



Senn's periosteal elevator.

For tubercular osteomyelitis, prepare a solution of iodin, sherry color, tincture of iodin one dram to water one quart and iodoform emulsion 10 per cent.



Macewen's chisel.

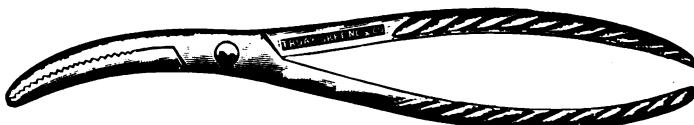
Sutures:

Two surgeon's needles for catgut No. 2 for muscle and periosteal sutures, called buried sutures.

Two large curved needles for silk for tension sutures.

Six glover's needles for silkworm gut.

Two glover's needles for horsehair for superficial sutures.



Curved sequestrum forceps.

Ligatures:

Catgut No. 1 and No. 2 ten inches long.

Dressing, etc.:

Drainage tubes.



Rawhide mallet.

Iodoform and boric acid powder 1:5.

Protective silk or gutta-percha tissue.

One-half yard iodoform gauze.

One yard sterile gauze.



Von Bruns' chisel.

Pad of sterile cotton.

Two gauze roller bandages.

Two common roller bandages.

Posterior hollow splint, well padded.

Plaster-of-paris bandages and a roll of common cotton in reserve.

Twelve sterilized towels.

Three sterilized sheets.

A supply of gauze sponges.

A supply of gauze compresses.

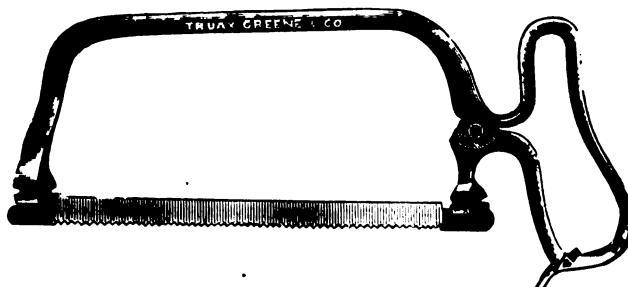
Six safety pins.

Resection of Joints.

Requirements as for preceding case minus the amputating knives, with the addition of the following:

Two chisels.

Two gouges.



Windler's saw.

Two long artery forceps.

One mallet.

One Volkmann's sharp spoon.

One set of bone drills.

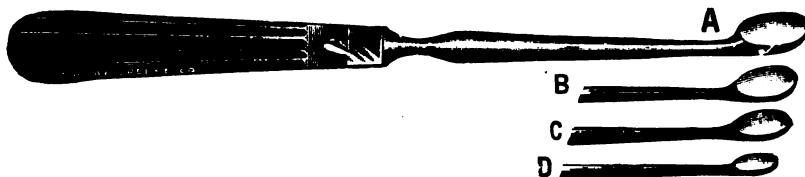
One scroll saw.

Silver wire.

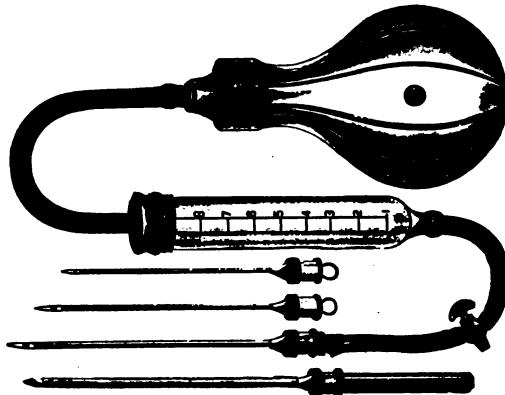
For tubercular cases prepare iodin solution for irrigation, sherry color (about a dram of iodin tincture to quart of sterilized water). Iodoform emulsion 10 per cent. Plaster-of-paris bandages.

Decalcified bone chips may be required.

Thermo-cautery is sometimes used to check bleeding from the vessels of the bone.



Volkmann's bone spoons.



Senn's injection syringe.

Drainage:

A mop of catgut.

Rubber tubing.

Iodoform gauze.

Arthrectomy.

(Excision of soft structures of joints.)

Preparation same as for resection of joints.



Senne's chatelaine for nurses.

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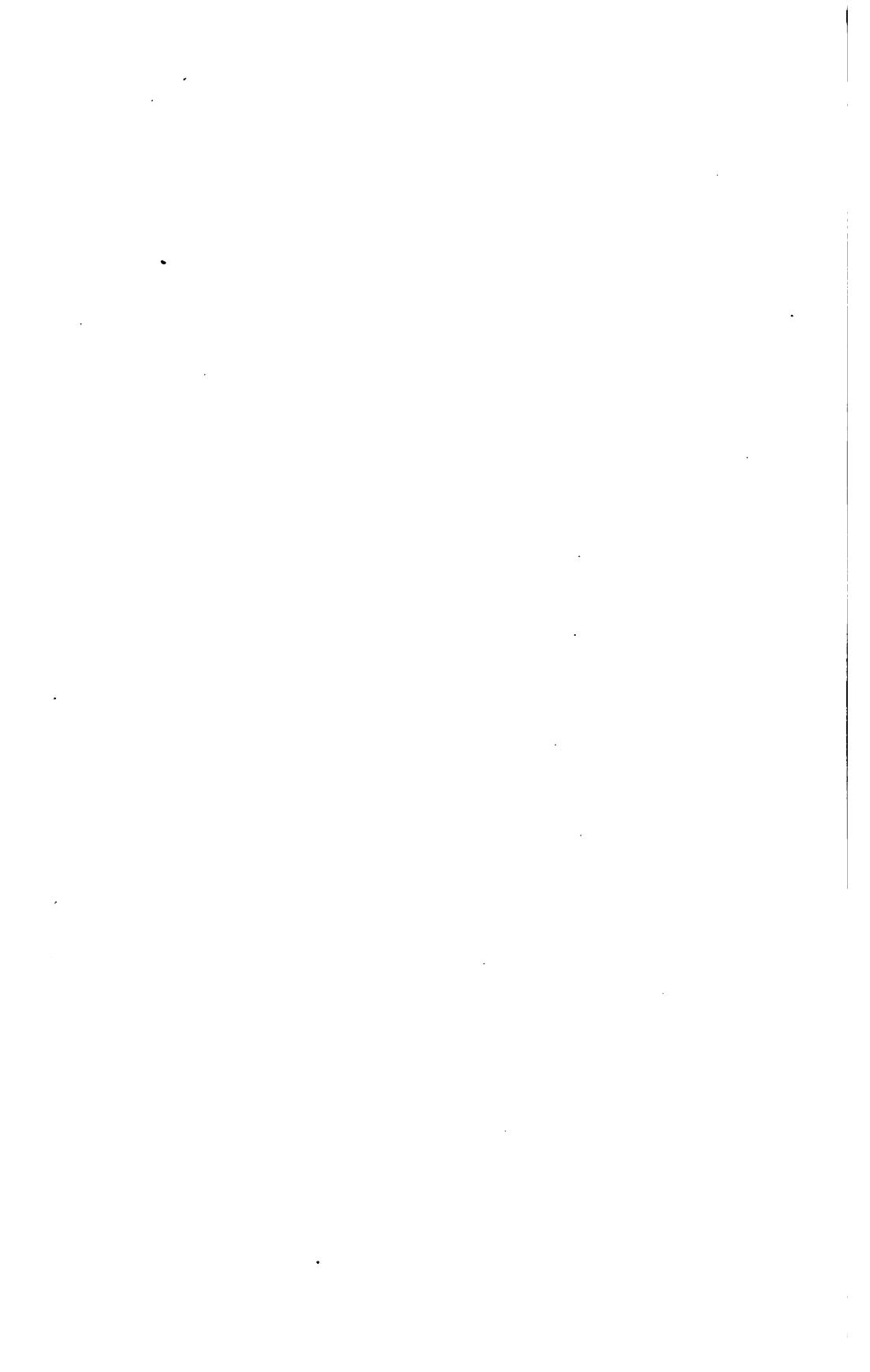
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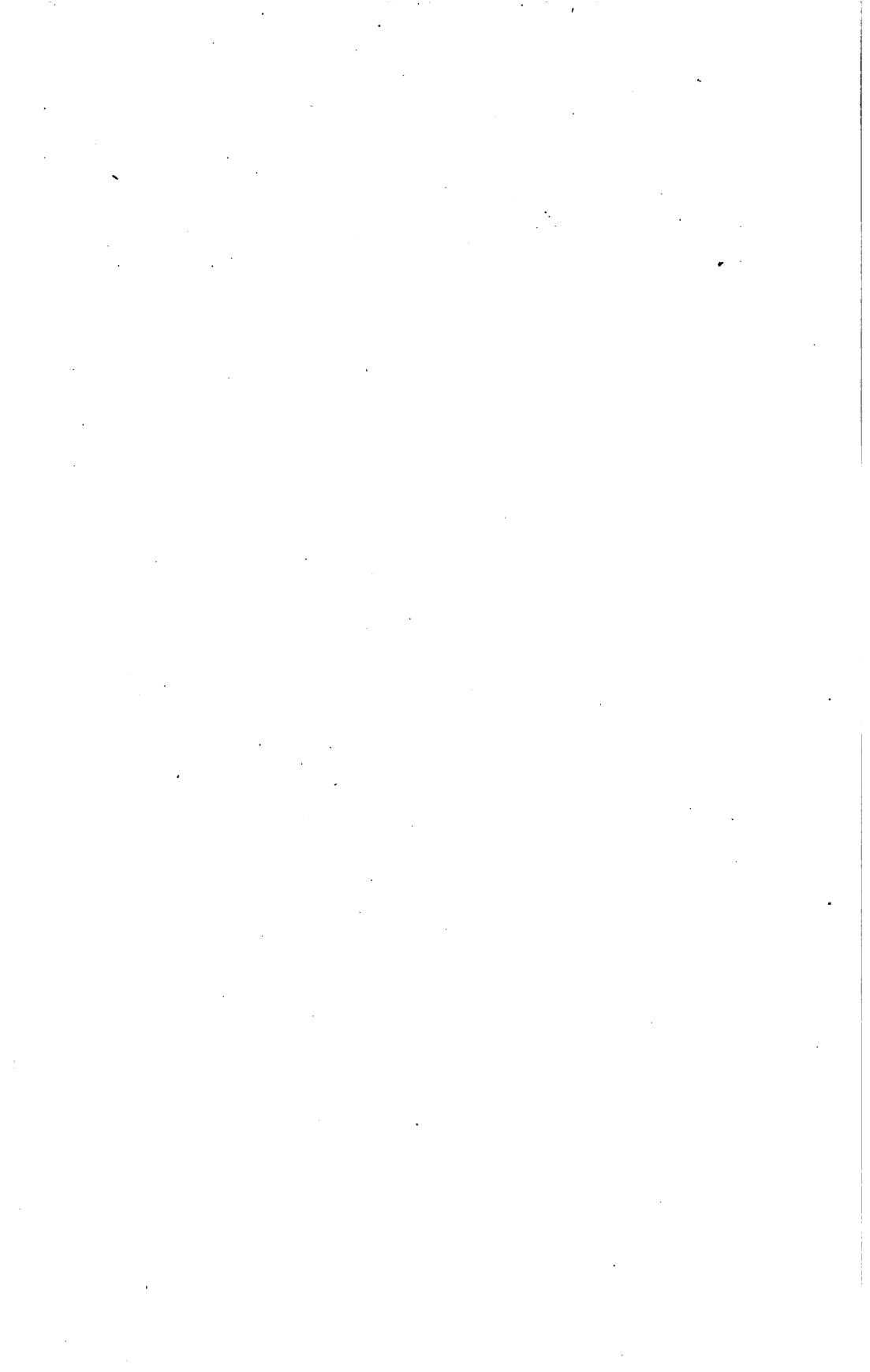
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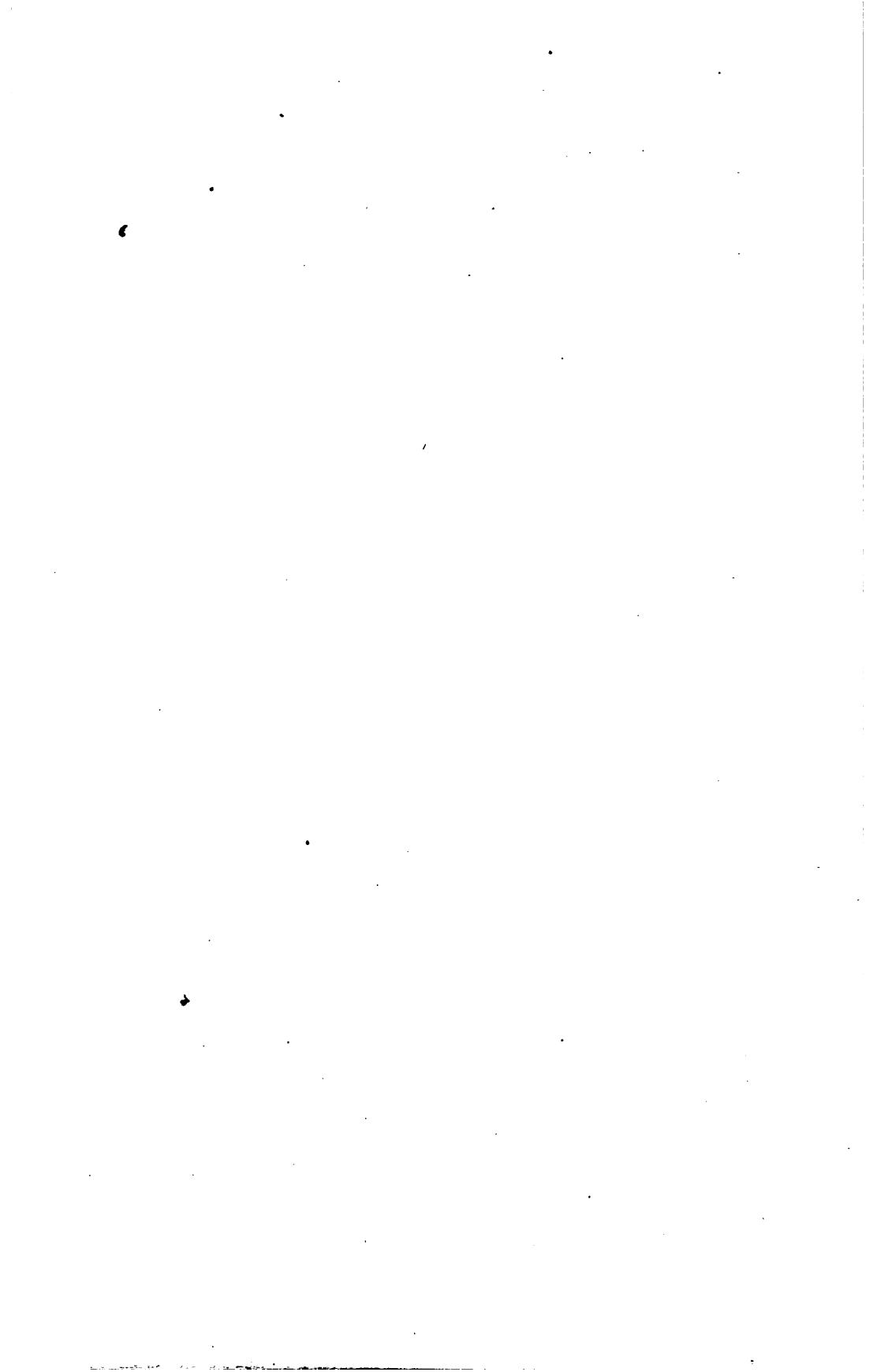
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